ENGINEERING and MINING JOURNAL.

VOL. XXVI., No. 26.

RICHARD P. ROTHWELL, C. E., M. E., } Editors.
ROSSITER W. RAYMOND, Ph. D., }

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL, P. O. Box 4404, New York. Articles written by Mr. RAYMOND will be signed thus *

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1 Gram = 15·4323 grs.
1 Grain = 0·0648 gram.
1 Kilogrameter = 7·2331 ft.-lbs.
1 Foot-pound = 0·1383 kgm.
1 Atmosphere = 14·7 lbs. per sq. in. = 10·333 kilogs. per sq. meter = 29·922 in. or 760 mm. of mercury = 33·9 ft. or 10⅓ meters water.
1 Kilogram = 2·2046 lbs. av.
1 Pound av. = 0·4536 kilog.
1 Deg. Centigrade = 5-9 deg. F.−32°.
1 Deg. Fahrenheit = 9-5 deg. C.+32°.
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1 Heat-unit (lb. water raised 1° F.) = 772 ft.-lbs = 0·252 cal.

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THE NATIONAL ACADEMY AND THE NATIONAL SURVEYS.

The National Academy of Sciences was required by law to consider, at its recent meeting, the subject of national surveys, and to report to Congress a plan for carrying on this work, "on such general system as will, in their judgment, secure the best results at the least possible cost," and also for publishing and distributing reports, maps, and documents. Prof. O. C. MARSH, Acting President of the Academy since Prof. HENRY'S death, appointed as the special committee to which the subject was referred Professors JAMES D. DANA, WILLIAM B. ROGERS, J. S. NEWBERRY, W. P. TROWBRIDGE, SIMON NEWCOMB, and ALEXANDER AGASSIZ; and the report of this committee, as adopted November 6th, 1878, by the Academy, now lies before us.

This report proposes (1) that the present geographical and geological surveys west of the 100th meridian, under the War Department, the similar surveys under the Interior Department, and the land surveys under the Land Office, be discontinued; (2) that the present Coast Survey be transferred to the Department of the Interior, be called the Coast and Interior Survey, and embrace, in addition to its former work, a geodetic survey of the whole public domain, a topographical survey, comprising detailed topographical work and rapid reconnoissance, and land-parceling surveys; (3) that an independent organization be established under the Department of the Interior, to be known as the Geological Survey, and to be charged with the study of the geological structure and economic resources of the public domain; (4) that the Superintendent of the Coast and Interior Survey, and the Director of the Geological Survey be appointed by the President, and report to the Secretary of the Interior; (5) that the Land Office, controlling the disposition and sale of the public lands, including all questions of title and record, call upon the Interior Survey for all surveys and measurements, and upon the Geological Survey for all information as to the value and classification of lands; (6) that all collections be ultimately transferred to the National Museum; (7) that of the publications of the surveys, besides the number which Congress may order for distribution, three thousand copies be published for scientific exchanges and for sale; and, finally (8), that a commission be formed, to consist of the Commissioner of the Land Office, the Superintendent of the Coast and Interior Survey, the Director of the Geological Survey, the Chief of Engineers of the Army, and three other persons appointed by the President, to report to Congress a standard of classification and valuation of the public land, together with a system of land-parceling survey. This is a summary of the conclusions, without the arguments of the Academy.

We have heard but one criticism as to the constitution of the committee, namely, that its members, with a single exception, are instructors in scientific schools, and would naturally desire their graduates to have opportunities of entering the scientific service of the government. But we do not see that this feeling need affect their report. Whether the War Department or the Interior Department superintends the public surveys, there have always been and would always be numerous civilian employés. The work of Mr. CLARENCE KING is an example of a scientific survey under the Chief of Engineers, with a civilian director and an almost exclusively civilian corps. We do not believe that any jealousy of the army has dictated the recommendations of the committee.

There is no doubt that the present hap-hazard system is the worst that we could have. Besides the unnecessary cost, the overlapping and repetition of work and the open or concealed hostility of different parties, struggling for annual appropriations from Congress, there is the great evil of the publication in official reports of masses of unnecessary, ill-digested, and contradictory material. If the geological surveys were under one head, contradictory statements from different parties would be noted, sifted, and reconciled before publication. A scientific (to say nothing of a literary) censorship would be a great blessing to the public.

The radical changes proposed are the removal of scientific surveys from the War Department; the removal of the land-parceling surveys from the Land Office; the enlargement of the work of the Coast Survey and its removal from the Treasury Department; and the division of the surveys into two classes, under two independent organizations, in the Interior Department. This combined concentration of responsibility and division of labor is plausible and theoretically sound.

"But," it may be said, "in practice it would prove difficult to execute. At present, the land surveyors, mineral surveyors, and registers and receivers, are all under one head, the Commissioner of the Land Office. Would his work of selling the public lands be as promptly done if the land surveyors who laid them out were under another head, and the mineral surveyors under a third? He would have to call on these other bureaux, says the Academy, for all such work. But the other bureaux would either do the work as it is now done, in which case there would be no gain, or they would do it with more scientific accuracy, in which case it would take more time, and the public business would suffer. The source of many evils has been the fact that population, in our western domain, rushes ahead of the public surveys to occupy the land. It is more important to run the lines quickly, plot the mining claims, roughly determine the character of the land, and give somebody a good title, than

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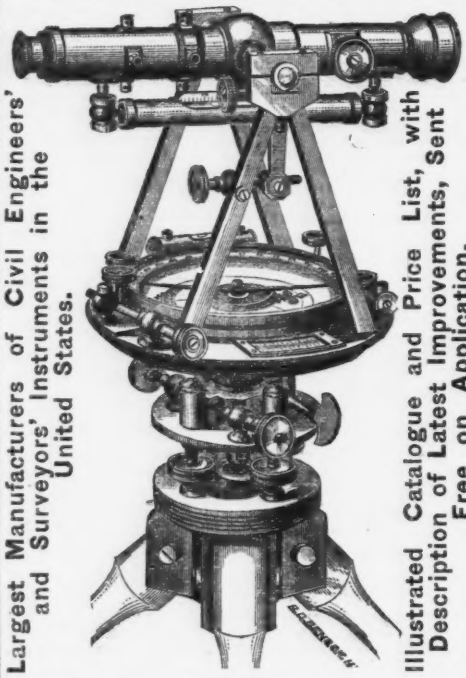

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THE DIRECTORS OF THE EMPIRE GOLD MINING COMPANY have this day declared a dividend of ten cents in gold per share (par value $10) out of the net earnings for the month of November, payable at the office of the Treasurer, S. V. WHITE, No. 8 Wall street, on the 21st day of December, inst. The books to close on December 26th and re-open on January 2d, 1879.

GEO. H. HANDFORTH, Secretary.

MEETINGS.

PHILADELPHIA AND READING RAILROAD CO.
GENERAL OFFICE, 227 SOUTH FOURTH STREET.
PHILADELPHIA, December 16, 1878.

NOTICE IS HEREBY GIVEN TO THE Stockholders of this Company, that the Annual Meeting and Election for President, six Managers, Treasurer, and Secretary will take place at Musical Fund Hall, Locust Street, above Eighth, on the second Monday, 13th of January next, at 12 M.

DAVID J. BROWN,
Secretary.

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A. P. MARSHALL, Secretary and Assistant Treasurer, New York.
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"But," it may be said, "in practice it would prove difficult to execute. At present, the land surveyors, mineral surveyors, and registers and receivers, are all under one head, the Commissioner of the Land Office. Would his work of selling the public lands be as promptly done if the land surveyors who laid them out were under another head, and the mineral surveyors under a third? He would have to call on these other bureaux, says the Academy, for all such work. But the other bureaux would either do the work as it is now done, in which case there would be no gain, or they would do it with more scientific accuracy, in which case it would take more time, and the public business would suffer. The source of many evils has been the fact that population, in our western domain, rushes ahead of the public surveys to occupy the land. It is more important to run the lines quickly, plot the mining claims, roughly determine the character of the land, and give somebody a good title, than

to retard development by waiting for the operations of a comprehensive surveying-bureau."

We state this objection as fairly as possible, and admit its force. But we do not think it decisive. It proves only that a new bureau of surveys would have to meet the necessities of the case by a suitable plan of operations; and it ignores the probability that such a plan might secure better results without sacrificing time. As for the mineral land-surveyors, they would not, we think, come under the geological survey. It is useless to attempt to ascertain much about mineral deposits before their development; and what any intelligent surveyor can say is all that the government needs to know, under our present or any similar mining law.

But another objection is raised. "The work of geological and topographical reconnoissances ought to be done by the same parties. It is unnecessarily multiplying officials to send two parties over the same ground, one to 'do' the geology and the other the topography."

There is force in this suggestion, so far as mere reconnoissances are concerned. When it comes to careful and connected work, however, it will be found that different parties do practically traverse the ground, for the simple reason that the geologist and collector can not suit his pace to that of the topographer. Where one is delayed, the other may move rapidly, and *vice versa*. Geological parties never hamper themselves with geodetical work unless they are obliged to do so by the absence of suitable maps.

"But," it is urged again, "the War Department ought to, and does, prepare maps of the country for use in its defense. Why not allow this work which would be done anyhow by that department, to be done by it exclusively?"

The War Department uses the Coast Survey maps, without repeating the work of that survey, and could do the same with any maps accurately prepared for it by a special bureau.

"But the best organization for the execution of general scientific and topographical surveys is a military one; and the system of our army in the matters of discipline, accounts, etc., is just what is wanted for such enterprises. Moreover, the best way to utilize in time of peace the large engineer corps which our country ought to maintain for the contingency of war, is to employ its officers in such work as will both repay the cost of their education and support, and also by familiarizing them with the whole country, render them more efficient in its defense."

This is perfectly true; and we frankly confess that our preference would be to see the scientific surveys conducted under the War Department, with army officers at the head of expeditions as disbursing officers and executive managers, and civilians in such scientific positions as required their special attainments. It is true that the army engineers as a class do not want this sort of work; and it is also true that they are at present far too few in number to do it. But we think there ought to be more of them, and that they ought to be made to engage in such field-work for their own good and that of the service to which they belong. Moreover, we fear that measures which narrow the duties of our military engineers in peace will tend to strengthen the opposition of demagogues to a large staff corps, whereas, in our judgment, what we need most for national defense is the only thing we can not improvise in an emergency, namely, a trained staff. There never was a better chance to secure this without expense than is furnished by the work of the national scientific surveys.

But if we can not have what we would like best, we shall not on that account reject a reasonably good substitute. And while the Engineer corps is as small as it now is, it would be useless to expect it to do more than it is now doing. Moreover, the plan of the Academy expressly suggests the detail of army and navy officers for duty on the surveys; though this is not the same thing as putting the surveys under the military system. With regard to that point, we are free to hope that the reorganization proposed would imitate the system of the army; and at least we do not fear that it would eventuate in any thing so bad as the chaos of irresponsible interferences which has ruled until now.

Failing any thing better, therefore, we must approve the Academy's plan; and while we find it open to criticism in some particulars, we must admit that it is the best complete scheme that has yet been suggested. Moreover, it looks, to us, like a scheme which may possibly be adopted; but on that head we shall know more when Congress begins to debate t. *

THE HEAT OF THE COMSTOCK MINES.

One of the most important elements in the cost of mining in the Comstock deep mines is the remarkably high temperature encountered. This temperature increases rapidly, but not uniformly in depth, and is especially intense wherever large amounts of water are met with. Though the miners have not yet penetrated to a vertical depth of more than 2000 to 2300 feet, yet a temperature of from 150° to, it is said, 165° Fahr. has been encountered in the water of some of the lower levels. In this excessively heated, moist atmosphere a man can work but a few minutes t a time, and it takes from three to four men relieving each other to keep the work steadily progressing, or, as it is termed, it requires from three to four men to "swing a pick;" in other words, a man can do but from one third to one fourth as much work in places in these mines as he would in an ordinary temperature; and as there is not a little injury to the health of the men from this work, they are necessarily paid extra high wages; hence the cost of work in the Comstock mines is enormous, and is increasing steadily. We can appreciate, therefore, the interest attached to the question of the cause of the excessive heat in the Comstock, and the probability of its increase in depth.

The Rosebridge Colliery, in Lancashire, England, the Viviers Reunis Colliery, in Belgium, the Hartz Silver Mines, the Sperenberg bore-hole, are all deeper than the workings on the Comstock, and yet no such temperature has been met with. It is well known that the temperature of the rocks increases as we go down from the surface, and numerous observations have shown that though this increment rate is by no means uniform, it is rarely more than 1° Fahr. for each 40 feet gained in depth, and more generally the average rate is nearer 1° for 60 feet, the higher rate being met with in copper and tin lodes of Cornwall.

In the Comstock mines, a temperature has been met with of over 160° Fahr. in the incoming water, and it is said 140° to 150° in the rock in some of the levels, at a depth not exceeding 2200 feet from the surface. If we assume the average surface-rock temperature as 60° Fahr., this would give an average increase of 1° Fahr. for less than 25 feet in depth, or nearly double that found in the hottest known mines.

In a paper read at the Chattanooga Meeting of the American Institute of Mining Engineers, May, 1878, Prof. John A. Church, E.M., presents a comprehensive and well-considered view of the subject, of which we give the following summary:

"Mining on the Comstock proceeds with extraordinary rapidity. The drifts are advanced steadily at the rate of three, five, and sometimes even eight and ten feet a day, and therefore the ground in which the miners are working is always fresh ground. * * *

"In the Comstock mines it is the custom, without exception, to blow the air through galvanized iron pipes, the diameter of which is usually from eight to twenty inches. The size most used is eleven inches in diameter, and the usual amount of air blown is about seven hundred cubic feet per minute, this being the supply for two to six or more men, working in one or two 'headers.'

"In most cases the air is not sent down from the surface, but taken from some point in the incline or at the bottom of the shaft. Its temperature may be assumed at about 85° or 90° F. in summer, though it is sometimes higher than this. * * *

"Drifts that do not exceed two or three hundred feet in length are *usually* not above 110° or 112° F. in temperature, and more often they are below this. But when the length increases to 1200 and 1500 feet, the temperature may rise to 116° F. without any other change in the circumstances. * * *

"These limits are, however, not in the least degree true of the water which enters the drifts from the country rock, and also from the lode rocks. That approaches more nearly 150° Fahrenheit. The vast body of water which has filled the Savage and Hale and Norcross mines for more than a year, and from which it is safe to say a million tons of water have been pumped within twelve months, gave me a temperature of 154° Fahrenheit. * * *

"But the water varies in temperature in different parts of the lode, like the rock and the air. In the East cross-cut 2000-foot level of the Crown Point mine, which is noted for its extreme heat, the water, after flowing for nearly one hundred and fifty feet over the bottom of the drift, was found to have a temperature of 157° Fahrenheit. On the contrary, in other places the water is much less hot, but I believe it is as a rule always hotter than the air, and in many cases it appears to be hotter than the rock is found to be, except in especially hot spots.

"HOT AND COLD BELTS.

"The fact has frequently been referred to that there are points in the mines which are much hotter than the average. The East cross-cut of the Crown Point 2000-foot level, which was temporarily abandoned and boarded up on account of the heat, gave me an *air* temperature of 150° Fahrenheit, the thermometer being thrust through a crack in the boarding. * * *

"I am inclined to the opinion that, as a general rule, these hot areas lie in belts, and are not irregular or promiscuously placed in the mass of East country rock. * * *

"It is noticeable that the neighborhood of a dike is apt to be hotter than any other portion of the rock. * * *

"Hot belts are also found at the contact of the diorite and propylite in the Virginia mines. The diorite is itself in active decomposition, and mines which have carried drifts in or near it are very hot. The Julia has explored a quartz seam, which appears to lie entirely in the diorite, and this has proved to be one of the hot belts.

"This apparent concentration of the heat in the line of contact of two rocks is not supposed to be due to any thermal or electro-thermal action, but to depend merely upon the fact that in this neighborhood the ground is more broken and the surfaces of the rock increased. These conditions are obviously favorable to the action of atmospheric waters.

"Belts of excessively hot ground are not the only noticeable phenomena in these mines. More remarkable still are the belts of unusually *cold* rock. These are fewer in number than the hot belts, but they are strongly marked. They are always wet, and the water that drips through the crevices of the shattered rock that composes them is noticeably cold to the touch, and cools down the air of the drift. Such a wet, cold belt of rock exists on the 800-foot level of the Justice mine, and there is a very decided change of temperature in passing from one to the other side of it. Lest the low temperature of this spot should be attributed to the water which drains through it from the surface, it is well to add that water drips from the rock in numerous places in these as in most mines, and that usually it is hot, or at least warm. * * *

"Very often, usually in fact, the rock is perfectly dry, though very hot. That is the case in all the mines. Wet rock is the exception, and dry rock the rule, through the whole lode. In the drifts cut through this hot, dry rock, the walls of the freshly-exposed surfaces are painful to the hand, and the air is often filled with dust. The rock is both hard and tough, but, in spite of its strength, it gives an impression of fine porosity to the touch, due, probably to its trachytic character. * * *

"I have been led to refer the high temperatures encountered in the mines, not to the internal heat of the earth, nor to the residual heat of the rocks, which were once melted, but to chemical action now maintained in the erupted rocks.

"This action is not a combustion, for the oxidizable minerals in the lode and its accompanying rocks, the metallic sulphides, are little altered. In fact, the total quantity of pyrite and other sulphides is not large for the neighborhood of a min-

eral lode, but, on the contrary, strikingly small, and not sufficient to maintain the heat of the rocks and water, except under circumstances of unusually rapid oxidation. That no metallic oxidation of any moment goes on in these rocks is susceptible of proof. * * *

"In fact, the preservation of the sulphur compounds, in presence of so much heat and moisture, is a noticeable fact, which I have frequently remarked in all the mines. * * *

"The source of the heat is probably the chemical alteration of the feldspathic minerals of the propylite and other rocks. This change consists apparently in the process of transforming feldspar to clay, technically known as kaolinization, from the fact that china clay, or *kaolin*, is produced in this way. Numerous zones in which this process of alteration has gone so far as to produce complete disintegration of the rock are passed in drifts cut into the country rock on both sides of the lode. No analyses of this decomposed material are at hand; those which have been published always being made upon the clays of the lode itself, where the introduction of silica in large quantities has necessarily exerted a dominating influence upon all alterative processes. In the absence of such analyses, it is impossible to say whether the decomposition that has taken place to such a marked extent at a distance from the quartzes owes any of its force to the special solfataric action to which the filling of the lode may be ascribed, or whether more general agencies have been sufficient to produce the observed effects. Nor can it be declared, without such a critical analytic examination, that this great mass of heated rock, extending for miles in length and breadth, and for thousands of feet in depth, has passed through ages of drainage from the surface without undergoing some general change in its chemical structure.

"On the contrary I assume that alterative action has gone on throughout portions of these rocks, and is still in progress. * * *

"There is only one kind of chemical action that is known to have gone on to any considerable extent in the Comstock rocks, and that is the alteration of feldspar to kaolin. * * *

"There is good evidence that the chemical action is not confined to the surfaces of the mine openings, for in that case the rock would necessarily flake off and swell in consequence of its superficial alteration. This takes place to a considerable extent, but not enough to account for more than a small portion of the heat, and there are extensive areas where the drift remain for years without any visible sign of decomposition in the rocks. The principal part of the chemical action must take place in the body of the rock mass, and it is evidently necessary to find some means for the constant conveyance of the heat produced to the artificial openings.

"The vehicle for the conveyance of this heat I conceive to be gaseous currents, heated by the chemical action spoken of, penetrating the rocks in every direction, and tending to discharge themselves into any free channel, like a drift, opened in the ground. The source of this gas is primarily the atmosphere. Water is capable of absorbing 0·025 of its own volume of nitrogen, 0·046 of oxygen, and its own volume of carbonic anhydride at the ordinary atmospheric pressure. At a higher pressure the absorption is greater, and as the water in the rocks two thousand feet below the surface is under a considerable hydrostatic head, it probably contains a maximum quantity of gas.

"The fixation of this water in the solid form, by combination with the silicate of alumina, necessarily liberates the gas it has dissolved, and this gas must then seek to discharge itself at the only point that is free under natural conditions—the surface. On its way upward it continually meets fresh supplies of water, and is reabsorbed until the water becomes saturated. As the water would always carry down carbonic anhydride and air derived from meteoric sources, there would be additions at every rain-fall to the store of gas in the strata, and the cumulative results of years of this action must be the saturation of the rocks with gas, so that whatever is liberated by the solidification of the water will find no place to rest without pushing out some of the gas already held so abundantly in the interstices of the rocks. From the point where this chemical alteration of the feldspar takes place there must be a discharge of gas at least equal in quantity to the rain-fall which reaches that depth, and this stream of hot gas will take its way to the surface and maintain the heat lost by radiation from the rocks through which it passes.

"Though rocks readily yield passage to vapors and gases when dry, the contrary is true when they are wet; then the pores filled with water are closed to the gases. On the Comstock we find areas of wet and dry rock disposed in highly inclined sheets, of which the dry greatly preponderate in thickness, forming, indeed, the main mass of propylite, in which the wet portions stand as isolated layers. Both are heated, and to an equal degree, or at all events the experiments hitherto made have not been careful enough to ascertain any variation, but in the higher heat of the mine waters we may possibly have evidence of some wet bands that maintain a temperature excessively high even for the Comstock.

"It is quite possible that the wet layers serve as channels to carry down a reagent, water, which produces heat by chemical combination in the lower depths and the dry rocks serve to transmit to the surface the gases liberated from the combining water, and bringing the resultant heat with them. Thus the wet rocks are heated by decomposition in place, and the dry rock by the passage of hot gases from that decomposition.

"It is, therefore, conceivable that the rapid flow of heat into the drifts is caused by streams of hot gas filtering readily through the porous rock, under the pressure to which it must be subjected, as a consequence of its deep subterranean position. These gaseous currents do not make themselves evident to the senses over the ordinary surfaces of drifts, but they frequently pour out of drill-holes with strength sufficient to flare a candle-flame. 'Blowers' of gas are met with, but not with more than usual frequency in mining operations. Accumulations of choke-damp in old drifts are common, though perhaps not more so than in all mines. The mine waters evidently contain gas, which bubbles through them, and sometimes in quantity sufficient to produce a moderate boiling. * * *

"The presence of such gas currents affords another explanation of the hot spots observed in the mines. In discussing this phenomenon it was observed that these places lay in belts of rock that are peculiarly susceptible to decomposition; but, if the rocks are permeated by currents of hot gas, it is evident that those portions which are most fissured will give the most ready means of exit to the gas, and therefore be kept at the highest temperature. Such may be the true cause of the high heat observed in the Imperial incline, lying along the Black Dike, which is not everywhere exceptionally hot; and also in the northeast drift, on the 2001 level of the same mine, which is run along a branch dike. * * *

"Such currents of gas do not account for the cold belts of rock, which are not dense, but, in every case noticed, fissured and wet, and it is probable that both the causes here advanced—local decomposition of different intensities and gaseous currents—are in action. * * *

"It has been pointed out above that the susceptibility of the Comstock rocks to feldspathic decomposition can not be considered a peculiarity, since volcanic areas in other places, exhibit similar heat phenomena. All the rocks, propylite, diorite, and andesite, show this tendency to break up under the action of water. * * * Soft seams, hard rocks, which remain hard through years of exposure, and hard rocks which flake down and soften under the action of the air, are all met with, and apparently are not distinguished by mineralogical differences.

"Upon examining these varying layers, the conclusion seems irresistible that the very soft rocks have been the channels of the meteoric waters, and perhaps also of rising mineral waters, while the solid and unaltered ones have not been the seat of water movements to any great extent. This observation makes the heat of the hard rocks all the more noticeable. They are hot, and sometimes rock which is perfectly solid, both before and after exposure to the air, is as hot as any of the layers met with, though, as a rule, the more decomposed seams are either colder or hotter than the unchanged layers.

"In the decomposed layers which I have supposed to be the channels of the rising solfataric waters, the clay exists in a state of incomplete hydration. It absorbs water with great avidity, and under such circumstances develops unusual heat. When drifts are opened in such material, the clay absorbs moisture from the air currents, swells, and throws off flakes of rock which would come down indefinitely if they were not kept back by timbers. Sometimes, the breaking of a pump allows water to rise upon such a stratum, and then the swelling is so great and forcible that timbers twelve and fourteen inches thick are broken and split into small pieces.

"These decomposed layers may be looked upon as the furnaces of the district. They are found on both sides of the vein, and in all the rocks of the region. * *

"Whatever the exact mode of decomposition is, it is certain that the result is the same as if the Comstock mines were excavated in a mass of burning material. At present the source of the decomposition is probably atmospheric action. For a certain distance from the surface, which may be approximately put at 1000 feet, the process was complete or nearly so, before the advent of man. The fire had burned out, and the rock had cooled down.

"When this zone of burnt-out rock had been passed in the mines, a lower zone was entered, and here the fire was found to be still in progress. It is not unfrequently said that the heat of the mines has not increased as they have deepened, and in proof of the assertion it is reported that the first bodies of hot water struck were nearly as hot as those that have been tapped at lower levels. I am inclined to doubt the strict accuracy of this statement. * * *

"FUTURE INCREASE OF THE HEAT.

"I can not agree with the conclusion of Mr. King, that the heat of the rocks is brought in by water that rises from great depths and in a heated condition. I consider that the reverse action is the one which is really going on. The rock heats the water. * * *

"Since the theory that the rocks are heated by water drawn from great depths has been rejected in this report, it is necessary to explain how it is that the water coming into the mines is almost uniformly hotter than the rocks, except when it is palpably surface water, filtering down through a shattered seam.

"It seems to be pretty well settled that the waters of the lode occupy strata of rock which are generally parallel with it, these strata being separated by clays, dikes, or solid strata which are impervious to water, and accordingly retain the liquid between them. * * *

"I consider these water-bearing bands of rock lying parallel with the lode to be identical with some of the hot bands previously described, and a little consideration will show that the seamy and shattered condition which fits a rock for storing up water in large quantities also increases its susceptibility to decomposition by increasing the surfaces acted on. The vast quantities of water which have again and again suddenly flooded one mine after another are evidence that the reservoirs which contain them are also made up of shattered seams, for the undecomposed rock of this region is finely porous, and not coarsely porous. * * *

"These facts force upon us the conclusion that the high temperature of the floods of water is not necessarily due to the depth of their origin. It is more probable that the hot waters come from seams which, on account of their shattered condition, are both more susceptible to chemical action and also more capable of storing up the fluid. They are the 'hot belts' of the country rock. * * *

"The uniform disposition of the rocks in the Comstock region, entirely unbroken as they are by faults, gives strong probability to the supposition that these collections of water extend to great depths. * * *

"From all these considerations, it is judged that until water temperatures above 154° Fahrenheit are observed, we may content ourselves with the belief that nothing in the present condition of things indicates the certainty that the heat will ever rise to the boiling-point of water, 212° Fahrenheit. As above stated, it is rational to suppose that the access of atmospheric air and water must diminish in proportion to the depth after a certain point is reached. At that point the temperature will be at a maximum. Below it there will be a state of equilibrium, probably for a very considerable depth. Below that, the heat may diminish even to a point below that of the highest of the three zones. * * * The known depth required for the production of a temperature amounting to 130° Fahrenheit is so great that we may fairly doubt whether air or water penetrate to lower depths in quantity sufficient to maintain mineral decomposition with the activity necessary to obtain the boiling temperature. The boiling heat of the water at Steamboat Springs is evidence that the chemical action is going on there near the surface."

These extracts give concisely Professor CHURCH's opinion upon this interesting question; but we confess the data cited do not lead us to the same conclusion as that here arrived at. No doubt, chemical action in the manner suggested by Professor CHURCH may exert a considerable influence on the temperature of rocks near the surface; but we think the simple fact that the incoming water in certain cases *is hotter than any rocks yet met with in the mines* is a convincing proof that the seat of the heat is where the water comes from, and, according to all analogy, should be at a point much deeper than the present workings. It has been suggested that the water supply of the Comstock may be found in the water-shed of Lake Tahoe, which is at a much greater elevation than Virginia City. From this the water may be supposed to penetrate the earth's crust through fissures, to a great depth, where it is intensely heated, and as it again approaches the surface, where it finds its outlet in some places as hot springs, it gradually cools. The great fissure of the Comstock is one of the waterways through which these streams run till they find an outlet, and it is to be expected that as the workings attain greater depth they will find the water hotter and hotter. The maximum temperature which may be reached would, under this view of the case, be limited only by the depth to which the surface waters penetrate before they reach the Comstock mines.

In either event the question of the heat of the Comstock is a very important one, and were it not for the incalculable benefits which the Sutro Tunnel may bring to them, the not very distant future of Comstock mining would be extremely dubious.

PERSONALS.

Our Readers are invited to send us Items for this Column.

The Index to Volume XXVI., which closes with this number, will appear in a few weeks.

Those who appreciate the magnificent issue of the JOURNAL of the 21st of December, and those who approve of the policy of the paper, need

not hesitate to write us to that effect. We are not above the appreciation of discreetly-applied flattery.

The hard times, we believe, are passing away with the dying year, and the coming twelve months will inaugurate a season of real prosperity, such as this country has never before seen. So mote it be.

The Begole mineral farm, near Ouray, Colo., we are informed, has been sold for $75,000. This valuable property was recently described in an interesting letter by our special correspondent, W. W.

In our next number, announcements will be made of important improvements in the ENGINEERING AND MINING JOURNAL for the coming year. The JOURNAL is recognized everywhere as "THE BEST MINING PAPER IN THE WORLD," and during the coming year it will seek to increase the distance between it and its rivals.

W. MILNOR ROBERTS, the distinguished Civil Engineer, and one of the first and most prominent members of the American Society of Civil Engineers, has been commissioned by the Brazilian government to make a thorough examination upon the inland water routes of the empire, and upon the best means to be adopted for their improvement. Great value will be attached to Mr. ROBERTS's important work, and his reports will be looked for with interest by engineers everywhere. We understand Mr. ROBERTS's engagement will continue for several years.

It has been stated that the great Comstock operators have been badly pinched in the late collapse of the Comstock balloon. J. SKAE is said to have lost all he had, not only his interest in Sierra Nevada, but his water-works, etc., while his partners have also been heavy losers. This clique's losings are said to amount to $8,000,000. FLOOD, FAIR & Co. now hold the stocks; but if they were obliged to sell them at present prices, their losses, it is said, would amount also to about three million dollars. We have not heard of any very poignant sorrow being exhibited among "outsiders" on the reception of this report.

It seems strange to the uninitiated that a stock which declares 25c. a share per month dividend should sell at only from $1.25 to $1.50 per share, and some even suggested the presence of a little colored individual somewhere in the enterprise; but when it was reported that the broker who sold the stock had received 25 cents a share (20 per cent) for selling a stock which was declaring 15 to 20 per cent a month dividend, the colored urchin assumed the proportions of a full-sized "nigger," and people "want to know, you know," why so remarkably profitable a stock has to pay such unheard-of commissions for selling. Are we going to have another series of "resolutions," *à la Belle of Memphis*, from the governing committee of the Stock Board?

It is whispered among those who are "generally well informed" on such matters, that a "job" was put up upon the English investors in the matter of the Colorado Terrible Stock (or "Colorado United," as it is officially styled) sold in London the past summer; it is even hinted that some of the officers of the company were not wholly ignorant of the nature of the "transaction." It will be remembered that early in the year Colorado United stock was selling in London at *over* £7 per share, to which figure it had been rapidly advanced under glowing official and non-official reports from the mines, while the American holders were unloading on the London market. Since the American interest was reported as sold out (for about $400,000) in August, the stock has rapidly declined till it is now quoted at £2, and the reports of a "job" have come to be circulated. The English had already an unfortunate experience in Terrible, which they bought at a large price, and then had to buy again to get a title. If the rumors current are well founded, we have here another example of how the foreign interest in American mines is destroyed and the whole industry injured by disreputable practices.

THE PERUVIAN NITRATE COMPANY.—The *South Pacific Times* of November 28th says: "The new Nitrate Company has finally terminated its differences with the Banco del Peru. The sum owing the latter will be paid by the Associated Banks in monthly installments, as also monthly interest, until the whole amount of the indebtedness has been paid."

SONORA ANTHRACITE COAL.—About a year ago, a large deposit of excellent anthracite coal was discovered near Barranca, Sonora, and it has been used with satisfaction at the Barranca mill, which is engaged in the pulverization of ores. The mine is 6½ miles from the mill, and in the vicinity of several mining towns. The approaches from Guaymas, from which it is distant 125 miles, are almost entirely level, and there is but a moderate grade from San Antonio. The dip of the coal-beds approximates to 10 degrees, the course being northeast. So far, an incline 70 feet long has been excavated, all the way in anthracite perfectly free from slate. The roof is composed of excellent fire-clay. It is considered by the engineer of the Barranca Mill superior to Pennsylvania anthracite, and he testifies that it gives no clinkers. Gen. W. S. Rosecrans reports on a specimen brought to San Francisco that the specific gravity is 1·77, whereas that of Pennsylvania anthracite is about 1·5. Mr. W. Bruckner, M.E., states that an analysis of the coal shows it to have but 4½ per cent ash. He thinks this Sonora anthracite belongs to a much older formation than the anthracite coal of New Mexico, described by him in Prof. R. W. Raymond's Report to the Secretary of the Treasury in 1870; in fact, he thinks it is sub-carboniferous, or older than the Pennsylvania deposits. We have no particulars of the grounds upon which this opinion is based, but the appearance of the coal does not apparently confirm it.

ZOOLOGICAL REGIONS AND THEIR PROBABLE DYNAMICS.

Naturalists have doubtless been struck by the remarkable fact, stated by Wallace, regarding the almost, if not quite, continental difference between the fauna, extinct and recent, found in the small island of Baly, and the animals obtained in the island of Lombock, separated only by a strait of 15 miles, with, however, a very deep sea between.

Equally striking are the statements and remarks made by Lyell, in commenting upon the recently extinct fauna, especially the mollusks of the Madeira Isles, when contrasting those of Funchal on the west with those of Porto Santo on the east, only 30 miles distant. Lyell, in his *Principles*, 2d vol., pp. 426 and 427, closes the discussion of this subject by saying, "In truth, the discordance is more like that of two of the six great zoölogical provinces of the globe before described, than of two islands of the same province in sight of each other."

These, in connection with other similar interesting facts regarding the distribution of animals, as given in Wallace's latest work, induced me to examine closely the six great geographical regions proposed by Sclater and adopted by Lyell, as well as later, with little or no modification, by Wallace.

That examination, combined with reflection on the probably operative causes, led me to some generalizations, which I herewith present, accompanied by a map giving the six regions, in order to make the explanations more intelligible.

If we elevate the north pole of a terrestrial globe 23½° above the horizon, and revolve the globe from west to east, until we bring the Straits between Baly and Lombock to the eastern horizon, we have then (following the wooden horizon) a great circle defined on the globe, which great circle, after passing north through the above straits, passes also through the Straits of Macassar, and thus pretty accurately marks the dividing line between Sclater's Australian region on the east and his Indian, or Wallace's oriental region, on the west.

Now let us revolve the globe in the same direction 72° more, estimated on the equator, or one fifth of the circumference of the globe, and we find a great circle marked by the eastern wooden horizon, which pretty accurately defines Sclater's line between the Indian region on the east and the Palæarctic and Ethiopian on the west.

Again, if we revolve the globe east 72° more, we obtain the boundary line beween the Palæarctic combined with the Ethiopian, on the east, and the Neotropic on the west.

This line, traced on the best globes and maps, seems to pass between Funchal and Porto Santo; but if it does not, when continued quite regularly, perhaps we are justified in assuming that these great continental lines—for they are such—are not *perfectly* regular curves, but conformed somewhat to the original irregularities of the deep sea bottom, while emerging as land from the ocean. Whether this emergence from beneath the waters was the result of long-continued depositions brought from higher ground to estuaries, and thence to the ocean, or resulted from the upheaving reaction of the earth's interior upon the submerged crust, or from the effects of both causes combined, matters not materially for our present investigation.

Let us again revolve the globe an additional 72° to the east, always measuring on the equator, and we bring this time to the eastern horizon a great circle dividing Sclater's Neotropic from his Nearctic region or province.

In the same manner, another turn of 72° will define the boundary between the Nearctic and Australian, thus bringing us back to the place of beginning, and assigning a mathematical lune comprising one fifth of the globe superficies to each zoölogical region, except the central. The center lune (which is probably also the zoölogical center from which dispersion took place) embraces *two* regions, a northern and southern (Palæarctic and Ethiopian), while as we go west from that center, we have a southern region (Neotropic), and then a northern (Nearctic); but, going east from that center, we have first a northern, or at least northeastern (Oriental), and then a southern zoölogical region, the Australian.

Further investigation will show us that these curved lines, or arcs of great circles, which are trends of continents, form with meridians an angle of about 23½° (as I showed some years since in a work entitled *Key to the Geology of the Globe*), and that they are secondaries to certain solstitial phases of the ecliptic. Furthermore, the central lune of 72° on the equator has its two arcs equidistant from the center of the magnetic system (as shown in the above work) and from an imaginary plane dividing our earth into two hemispheres, an eastern and a western, having in each about equal amounts of land and water and magnetic force, inasmuch as the boundaries of this lune are, on the equator, respectively 36° (the half of 72°) each side of St. Thomas's Island, near which the terrestrial equator intersects the magnetic equator, and whence a great circle, passing through the geographical north and south poles, divides the Pacific Ocean vertically into nearly equal halves, and passing through Behring's Straits and the highest Alps in Europe, divides all the land on the globe more equally into two parts than any other great circle that can be drawn, as demonstrated by measurements east and west from St. Thomas's Island or from the Alps to Behring's Straits, and other continental boundaries, always measuring from a given point to others east and west in the same latitude.

Thus it would appear, especially as the areas or foci of greatest magnetic *intensity* are about equidistant from this magnetic center, that the earth's magnetism was an important factor in bringing the ocean-bed gradually nearer the surface, and in determining the outline which the new land would assume.

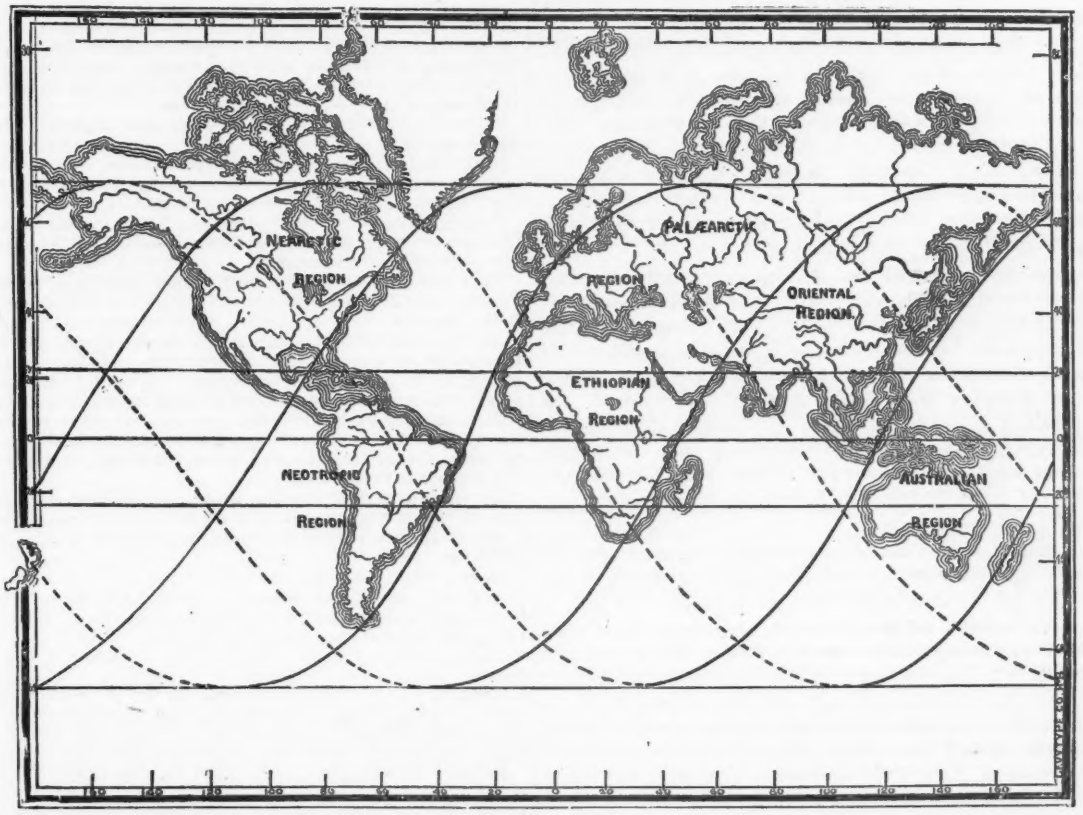
Probably the thermal difference, generating electrical currents from east to west along the ecliptic most strongly, but also on the earth generally, especially on the large continental areas; likewise from the hot southern to the colder northern lands (as demonstrated by the experiments with the galvanometer, detailed in my last communication), gave rise, through these so-called electrical currents in the earth's crust, to magnetic force along continental boundary-lines, the main trends of which are perpendicular to the solstitial and equinoctial planes. Whether or not this power in our earth's crust to give directive force to a stratum of rocks, etc., always requires in the rock or soil the presence of a certain amount of molecules of iron or other paramagnetic material, remains yet to be tested by experiment.

The power, as a factor, to raise land by reaction from the interior, or to

cause the deposition of new materials in the trends or direction indicated, may have been exerted directly as terrestrial magnetism caused by electrical currents, or indirectly by correlation or conversion of these other modes of motion into heat, chemical action, etc. If by means of the mode of motion termed heat, Col. Totten's experiments on the building-stones used in architecture show that 50 miles' thickness of the earth's crust having its temperature raised to 600° Fahr. might produce an elevation of 1000 feet; or, if increased to 800° Fahr., might expand 1500 feet above its position at the usual low temperature.

It is generally admitted by geologists that our present dry land was formed at the bed of the ocean, or occasionally at estuaries, or under fresh-water expansions; and it appears reasonable that the five described lunes or areas should be formed mainly at different geological periods. These periods are found to be more recent as we go, in our hemisphere, in a southerly direction; because the rivers carrying most detritus, such as the Mississippi, Amazon, Ganges, Indus, Nile, Yang-tse-Kiang, etc., have their mouths almost or entirely within the Tropic of Cancer, and terminate chiefly in the Tertiary epoch. The formation of land is brought about, perhaps, at first by gentle uprising of the crust, and subsequent deposition thereon. Areas which, at their original bed, were a considerable distance apart, may, when emerging from the ocean, approximate more closely. This may, to a certain extent, account for some of the curious anomalies, as given by Lyell and Wallace, to which attention was called at the commencement of this article.

Another significant fact seems worthy of notice: The four areas of



greatest magnetic intensity, around the four foci of greatest intensity, will be found respectively in each of the four lunes or zoölogical regions which are east and west of the center lune, thus leaving the central land (Palæarctic and Ethiopian provinces) to form around the center of the magnetic system. In the Australian region we find the highest magnetic intensity, which is given in Humboldt's *Cosmos*, vol. iv., p. 99, as 2·06 in the relative scale, or 15·60 in the absolute scale. In the Oriental region we have the weakest magnetic focus, 1·76 relative, or 13·30 absolute scale. The Neotropic region, or at least its lune, includes the weaker southern focus, 1·96 relative, or 14·90 absolute; while the Nearctic incloses the stronger northern or Canadian focus, 1·87 relative, or 14·21 absolute.

Measured on a good Mercator's map, these foci will be found, as mentioned above, nearly equidistant from the center of the magnetic system which is at St. Thomas's Island on the equator; and if we add the figures representing the northeast focus to those of the southeast, the sum (1·76 + 2·06 = 3·82) is very nearly equal to the sum of the magnetic intensities in the western hemisphere, namely, 1·96 + 1·87 = 3·83.

ZOÖLOGICAL SUB-REGIONS.

In the accompanying Mercator's Map, those portions of great circles which define the eastern trends of zoölogical regions are indicated by continuous lines, while the other half of these great circles will be found traced in dotted lines. These dotted lines appear, to some extent, to *subdivide* the main zoölogical regions, as proposed by Wallace and others, into sub-regions: such as the Rocky Mountain, distinguished from the Canadian and Alleghany sub-regions; the Mexican from the Antillean; the Chilian somewhat nearly from the Brazilian, etc., etc. The coincidence, however, between the great circles as marking or defining sub-regions of different zoölogical significance is not nearly so striking as the fact that the main zoölogical regions of Sclater agree with the great continental outlines as traced by arcs of great circles, found to be equidistant when measured on the equator and to comprise one fifth of the superficial area of the globe, the center lune, however, embracing two zoölogical regions, while the others contain only one region or province.

NEW HARMONY, IND. 1878. RICHARD OWEN.

THE HOMESTAKE MINE.

The Homestake was among the first Black Hill properties bought in the interest of California capitalists, having been purchased by George Hearst, in conjunction with J. W. Gashwiler and Henry Janin, early in the month of April last. The mine, which embraces a number of valuable claims, covers an area 1500 feet long by 450 feet wide. The many tunnel and shaft openings in every part of it give evidence that the Homestake is one great, continuous body of paying ore. The most systematic and thorough developments have been made to test the real value of the property, and the result has been the erection of an 80-stamp mill and the preparation to work the mine by all appliances that will procure a steady yield of bullion. Other mills will soon be erected, and the day is not far distant when the operations of the Homestake Company will rival the largest schemes of the Comstock. The average yield of the ore per ton will not fall short of $15. The mill capacity is fully 175 tons per day. Here, then, we have nearly a million dollars as the result of one mill for a single year. Samuel McMasters, a most capable and reliable man, has been appointed superintendent of the mine. The mill, which sits directly on the mine, has been built of the finest seasoned pine lumber, and has dimensions of 100 feet front, 120 feet deep, and 56 feet from floor to floor. Every part of the construction has been conducted by expert mechanics, and the mill is a model of mill architecture. Two immense ore-bins, having a capacity of 2000 tons, have been erected, and into these the ore is dumped by the cars from a tramway running from the mine into the upper portion of the building. From these the ore passes over screens, the fine particles going into bins, and the coarse to the two Blake ore-breakers and then into the bins, where it is fed to the batteries by the Hendy self-feeder. Over 100,000 feet of lumber were used in the construction of the main building.

THE MACHINERY

consists of two boilers 54×16, having 200 horse-power, accompanied by a splendidly-built and finished engine 20×42. The battery consists of 80 stamps, weighing 750 pounds each; two Blake rock-breakers, 9×15 each, and the Hendy self-feeder mentioned above. The entire weight of machinery is 496,000 pounds, the freight upon which alone cost the snug sum of $38,000. The mill cost fully $100,000. The batteries will have a capacity of from 175 to 200 tons per twenty-four hours, or more than two tons of average quartz per stamp.

THE HOISTING MACHINERY

consists of two 12×24 engines of 75 horse-power, which are capable of raising two tons 400 feet per minute; two reels for hoisting, supplied with a steel-wire cable which will sink to a depth of 1000 feet. This cable is a most powerful and costly one, being two and three fourths inches in diameter, weighing one pound and a quarter to the foot. Added to this is a six-inch drawing and lift pump with five-foot stroke, having a capacity of 5000 gallons per hour. The entire enterprise is one of immense proportions and one that will be a profitable monument to the nerve and money of San Francisco capitalists. Mr. Hearst has taken the lead in the Black Hills quartz reduction, and the coming years of steady Homestake bullion shipments will record the wisdom of his extensive, systematic, and fearless operations. This immense and splendidly-appointed structure is now in operation, turning out gold bullion at the rate of about $90,000 per month, a production that can probably be kept up for many consecutive years, and may easily be increased with additional milling facilities.—*Pacific Coast Mining Review.*

FRENCH AND BELGIAN COAL-DUST.—From the *débris* of its coal mines France makes annually 700,000 tons of excellent fuel, and Belgium, 500,000 tons.

REPORT OF THE COMMITTEE ON SURVEYS.

The Committee of the National Academy of Sciences, to which has been referred the consideration of the following requirement of law contained in the act making appropriations for Sundry Civil Expenses of the Government for the fiscal year ending June 30th, 1879, and for other purposes, approved June 20th, 1878, namely,

"And the National Academy of Sciences are hereby required, at their next meeting, to take into consideration the methods and expenses of conducting all surveys of a scientific character under the War or Interior Department and the surveys of the Land Office, and to report to Congress as soon thereafter as may be practicable a plan for surveying and mapping the Territories of the United States on such general system as will, in their judgment, secure the best results at the least possible cost; and also to recommend to Congress a suitable plan for the publication and distribution of reports, maps, and documents, and other results of the said surveys,"

Submits the following report:

The committee considers that the field of inquiry proposed to the Academy is intended to embrace only such surveys as pertain to the public domain. It has not included, in its plan of organization, surveys and investigations, however scientific in method and character, which apply solely to engineering works, such as the improvements of rivers, harbors, lakes, etc.; irrigation and drainage of public lands, and protection of alluvial regions from floods. Such surveys and investigations, being inseparably connected with engineering problems, should, in the judgment of the committee, be conducted by the engineer corps of the army. Nor does the committee recommend any change in the organization of the survey of the great lakes, as this is now nearly completed.

The works which seem to fall especially within the limits of the meaning of the law are the geographical surveys west of the one hundredth meridian under the War Department, the United States geographical and geological surveys of the Territories, and of the Rocky Mountain region under the Interior Department, and the system of land surveys under the supervision of the Land Office. Besides these, although not enumerated in the law, one of the most important works now in progress in the interior, under Act of Congress, is the geodetic work of the Coast and Geodetic Survey. Parties of this organization are now conducting a systematic triangulation at several points in the interior, and any general system such as is contemplated in the above law can not be wisely devised without taking into account the object and organization of this survey. The objects of these various surveys are: 1. An accurate geodetic survey. 2. A general geographical and topographical reconnoissance. 3. Land-parceling surveys, on which the government can part title to portions of the public domain. 4. The economic classification and valuation of the public domain. To these should be added the gradual completion of a general accurate topographical map of the whole territory of the United States, which shall serve as a basis for all the scientific and practical needs of the government and people. All this work may be included under two distinct and separate heads: 1. Surveys of mensuration. 2. Surveys of geology and economic resources of the soil.

We will first consider the present operations of the surveys of mensuration. Such surveys are now in progress under five different independent organizations—that of the Coast and Geodetic Survey of the geographical surveys west of the 100th meridian, under the War Department; of the topographical work of the two surveys under the Interior Department; and of the land survey under the Land Office. The final object of all these works of mensuration is the accurate determination of position and the laying down of lines and points by measurement. There is at present no coördination between these five surveys; their original determinations of position are independent; their systems of survey discordant; their results show many contradictions, and involve unnecessary expenditure. The geographical reconnoissances carried on under the War and Interior Departments are of little value for the parceling of land, while the land surveys are of correspondingly slight topographical and geographical value. The operations of the Coast and Geodetic Survey in the interior do not at present include topography and land parceling. To attain the desirable accuracy and economy it is absolutely essential that there should be only one geodetic system, one topographical system, and one land-parceling system, all conducted under the same head. It is evident that both topographical and land parceling surveys, to be properly coördinated and sufficiently exact, must be based upon a single rigid geodetic foundation. All these three divisions are departments of measuring, all are based upon accurate determinations of position, and, to be effectively and economically carried out, should be united into one comprehensive system. After a careful consideration of the facilities at the disposal of the several existing organizations engaged in this work, the committee believes that the Coast and Geodetic Survey is practically best prepared to execute the entire mensuration system required for the survey of the public domain. Within this domain the dominant interest of the United States is centered in the public lands which remain to be surveyed and sold. The administration of this domain, consisting of 1,101,107,183 acres, is necessarily within the Department of the Interior, while the Coast and Geodetic Survey, having been originally inaugurated to meet the wants of commerce, has been hitherto under the Treasury Department. In view of the paramount importance of the public lands, the committee recommends that the Coast and Geodetic Survey should be transferred from the Treasury Department to the Department of the Interior, retaining its original field of operations, and assuming also the entire mensuration of the public domain, and that, so modified and extended, it should hereafter be known as the United States Coast and Interior Survey. This organization would then embrace, in addition to its former work, a geodetic survey of the whole public domain; a topographical survey, comprising detailed topographical work and rapid reconnoissance and land-parceling surveys. The superintendent of the Coast and Interior Survey should be appointed by the President, and should report directly to the Secretary of the Interior.

The best interests of the public domain require for the purposes of intelligent administration a thorough knowledge of its geological structure, natural resources, and products. The domain embraces a vast mineral wealth in its soils—metals, salines, stones, clays, etc. To meet the requirements of existing laws in the disposition of the agricultural, mineral, pastoral, timber, desert, and swamp lands, a thorough investigation and classification of the acreage of the public domain is imperatively demanded. The committee therefore recommends that Congress should establish, under the Department of the Interior, an independent organization to be known as the United States Geological Survey, to be charged with the study of the geological structure and economical resources of the public domain; such survey to be placed under a director who shall be appointed by the President, and who shall report directly to the Secretary of the Interior. It should be specially provided that the director and members of the Geological Survey, charged as they are with the investigation of the natural resources of the public domain, should have no personal or private interests in the lands or mineral wealth of the region under survey, and should execute no surveys or examinations for private parties or corporations. Officers of the army and navy, when not otherwise employed, may be detailed by the Secretary of War or of the Navy to take part in the operations of the general survey.

With the inauguration of the two surveys above defined, the committee recommends a discontinuance, first, of the present geographical and geological surveys west of the one hundredth meridian under the War Department, except surveys necessary for military purposes and local internal improvements; second, the geographical and geological surveys now in progress under the Department of the Interior; and, third, the present land survey under the Land Office. The effect of the above changes will be to maintain within the Interior Department three distinct organizations—first, the Coast and Interior Survey, whose function shall embrace all questions of position and mensuration; second, the United States Geological Survey, whose functions shall be the determination of all questions relating to the geological structure and natural resources of the public domain; third, the Land Office, controlling the disposition and sale of the public lands, including all questions of title and record. With this division should be secured a perfect coördination and coöperation between the three branches. The Land Office should call upon the Coast and Interior Survey for all surveys and measurements required for the sale and disposition of lands. The Land Office should also call upon the United States Geological Survey for all information as to the value and classification of lands. The results of all the mensuration surveys, as soon as completed, should be immediately available for the Land Office, and for the Geological Survey, and for other branches of the government as required. The Geological Survey should be authorized to execute local topographical surveys for special purposes—such, for instance, as the subterraneous surveys of mining districts and metallic deposits, etc.

Each of the three organizations thus defined should make an annual report of its operations to the Secretary of the Interior. The publications of the Land Office should embrace reports of its business operations relating to the disposition and sale of land, together with the necessary maps. The publications of the Coast and Interior Survey, besides the annual report of operations, should consist of its geodetic results, geographical, topographical, and cadastral maps, coast charts, and such discussions and treatises connected therewith as the superintendent shall deem of value. The publications of the Geographical Survey should consist of an annual report of operations, geological and economic maps, illustrating the resources and classification of the land, reports upon general and economical geology in all its branches, with the necessarily connected paleontology.

All collections made by the Coast and Interior and the Geological Surveys, when no longer needed for the investigations in progress, should be transferred to the National Museum.

The committee recommends that, upon the organization of the United States Coast and Interior Survey and the United States Geological Survey, a commission should be formed, to consist of the Commissioner of the Land Office, Superintendent of the Coast and Interior Survey, Director of the United States Geological Survey, the Chief-Engineer of the Army, and three other persons to be appointed by the President, who shall take into consideration the codification of the present laws relating to the survey and disposition of the public domain, and who shall report to Congress, within one year, a standard of classification and valuation of the public land, together with a system of land-parceling survey. The necessity of this commission is evident from the fact that by far the larger part of the public domain lies in the region where, from geological and climatic causes, the lands are for the most part not valuable for field culture, and where the system of homestead, preëmption, and sale in accordance with existing laws is both impracticable and undesirable.

In regard to publications of the two surveys above defined, the committee recommends that, besides the number of copies of each report which Congress may order for its own distribution, 3000 copies be published for scientific exchanges by the heads of these surveys and for sale at the price of publication; that all literary and chartographical material received by the heads of these surveys in exchange be the property of the United States and form a part of the libraries of the two organizations; that the money resulting from the sale of these publications be covered into the Treasury. The committee recommends that the annual reports of operations of the two surveys accompany the report of the Secretary of the Interior; that the special memoirs and reports of both surveys be issued in uniform quarto series; that the style and scale of the chartographic publications be determined by the heads of each organization, so as to express the scientific results in the most effective and economical manner.

All of which is respectfully submitted. O. C. Marsh,
Acting President.

James D. Dana, William B. Rogers, J. S. Newberry, W. P. Trowbridge, Simon Newcomb, Alex. Agassiz, Members of the Committee.

The Great Hungarian Tunnel.—On the 21st Oct. the great Josef adit at Schemnitz in Hungary was opened. The works have been carried on since 1872, the Hungarian government granting £10,000 a year toward them. The adit is over ten miles long, being some 50 yards longer than the Mont Cenis Tunnel. The total cost of the undertaking was £459,900; it was carried out entirely by Hungarian enterprise, and partly with Hungarian machinery.

COST OF WORKING TRAMWAYS BY COMPRESSED-AIR CARS.*

By M. Mekarski.

Recal ing the results of his previous estimates,† M. Mekarski deduces that by a cubic meter of compressed air, at 25 atmospheres and at the average temperature 15° C., or 39° F., weighing 30 kilograms, the work that may be done per kilogram of air amounts to 13,300 kilogrameters: that is to say, 1 cubic foot of air at 25 atmospheres weighs 1·872 lbs., and the work that may be done per lb. of air amounts to 42,624 foot-pounds. And as the frictional resistance on tramways is often above 10 kilograms per tonne, or 22½ lbs. per ton, the expenditure of compressed air is at the rate of one kilogram per ton per kilometer, or 3·6 lbs. per ton per mile-run.

It has been proved that compressed air at 30 atmospheres can be produced by suitable apparatus, with a rise of temperature not exceeding 45° F., at the rate of 6 kilograms or 13¼ lbs. of air per H.P. per hour. Allowing a consumption of 1½ kilograms, or 3·31 lbs. of coal per H.P. per hour by steam-power, the consumption for 1 kilogram of compressed air is ¼ kilogram of coal; or, for 1 lb. of air, ¼ lb. of coal per H.P. per hour. It follows that on tramways it may be considered that compressed-air engines consume (3·6 × ¼ =) 0·9 lb. of coal per ton per mile on a level.

The cost of plant, buildings, and rolling stock is estimated on the assumption that each compressed-air engine travels 100 kilometers, or 62 miles, per day on duty, resting two days a week and making 25,000 kilometers, or 15,500 miles per year—equivalent to an average of 70 kilometers, or 43½ miles, per day. According to the contract prices for the material, it appears that for compressed-air cars, with stationary engine-power, and plant, the cost per car amounts to £1360; and that for a system of independent compressed-air engines, the total cost per engine is £1800.

In comparison with these estimates, the total cost for omnibuses, horses, harness, and stabling per omnibus of thirty-five seats, amounts to £1180; and to £1480 per omnibus of from forty-five to fifty seats.

The total cost of omnibus service, by the accounts of the Omnibus Company of Paris, amounts to 10·115d. per mile-run, and that for tramway service by horses amounts to 7·356d. per mile-run. For the service by compressed-air propulsion, the annual working cost, including a charge for interest on the excess capital cost, is estimated at 4·60d. per mile-run, if compressed-air cars be employed, or 6d. per mile-run for separate compressed-air engines. Thus an economy of 38 per cent and of 40 per cent, respectively, can be effected, comparing the compressed-air cars with the present tramway service, and the separate air-engines with the present omnibus system.

M. Mekarski's system is shortly to be put in operation in Nantes and in Paris.

CURIOSITIES OF CURRENCY.

The bank officer who saw a compensating advantage from the passage of the silver dollar bill because payments of silver would be so bulky as to assist in checking runs, and in cases of large amount would render a wheelbarrow necessary, probably based his remarks upon a knowledge of the experience of the Swedish merchants of the last century. During that period copper was the chief medium of exchange in Sweden, and business men who went out to collect their bills carried wheelbarrows to contain the copper dalers. The inconvenience of such a medium kept down trade—a result which the Spartans of old sought to obtain by the introduction of iron money. Cattle were the medium of exchange in still earlier times, Homer frequently valuing the armor of his heroes at so many head of cattle. Indeed, it is now generally conceded that our word pecuniary is derived from the Latin *pecus*, cattle. Sir H. S. Maine, in his interesting *Early History of Institutions*, shows that being counted by the head, the kine were called *capitale*, whence "capital," "chattel," and "cattle." Skins were early used as currency, and leather money is said to have been circulated in Russia as late as the reign of Peter the Great. Among the few facts that are left us about the laws and usages of Carthage is the employment of leather currency. Maize formerly circulated in Mexico; and in Norway corn is even now deposited in banks, and lent and borrowed. As our Indians use wampum, the natives of the East Indies, or portions of them, have resorted to cowry shells as small money, and a considerable export of them goes on from the Maldive and Laccadive islands. The Fijians circulate whales' teeth—red teeth expressing the higher denominations. The introduction of American gold into Europe displaced silver as the common measure of value—a position it held in Queen Elizabeth's reign. The French use the word *argent* (silver) as a comprehensive term for money, a circumstance illustrating the position the metal once held. A French *savant* is of the opinion that in the very earliest ages stone implements were used as the circulating medium between tribes. He bases his theory on the circumstance that some of the implements are made of materials not to be found in the region of their discovery. In our own colonial period, bullets and tobacco passed as currency, and, during the civil war, hotel-tickets, car-tickets, and even shoe-irons were accepted as such. Olive-oil continues to be the medium in some of the Mediterranean countries, and large transactions have been based upon it. Antioch and Alexandria are said to have used a wooden talent. Lead passes current in Burmah. Tin farthings were struck by Charles II. in 1680, a stud of copper being inserted in the middle of the coin to render counterfeiting more difficult, and tin half-pence and farthings were used as late as 1691, but never obtained a really wide circulation. Tin coins were formerly employed in Java and in Mexico, and the metal is said to be still current by weight in the Straits of Malacca. The Russian government, which owns the principal platinum mines, began fifty years ago to coin that metal, but after seventeen years of experiment gave it up. The appearance of the metal is inferior to gold, and the fact that it is seldom or never used for purposes of ornamentation is also against its use. Nevertheless, at the monetary conference at Paris, in 1867, the Russian representative proposed that platinum should be employed for the coinage of five-franc pieces. The forms of coins are represented in almost every shape, from the gold button or grain of Pondicherry to the scimetar-shaped pieces once employed in Persia. Austria finds it profitable to continue the coining of the Maria Theresa silver dollar, with the original design and date (1780), because of its great popularity in Northern Africa and the Levant. When the British government undertook the Abyssinian expedition, the military chest contained large quantities of these dollars, which are in great demand among the natives. In some portions of the Orient porcelain coins are used, and are quite in demand.—*Boston Jour. Commerce.*

* Abstract of a paper in the *Résumé de la Société des Ingénieurs civils*, 1878, p. 210. From the Proceedings of the Institution of Civil Engineers of London, edited by James Forrest, Secretary.

† *Vide* Minutes of Proceedings Inst. C. E., vols. xliii., p. 382, and xliv., p. 254.

EVERY MAN HIS OWN GAS-WORKS.

The most remarkable contribution to the solution of the problem of cheap illumination that has yet appeared in print, and which must, on its perusal, make gas stocks to tumble down to zero, and cause Edison, in whom we had been misled into entertaining considerable confidence, to hide his diminished head, is given in the columns of the *Telegraphic Journal*. At first reading we thought we recognized the style; but as the editor of our contemporary pays a touching tribute to American inventive genius in that he deems it necessary to assure his readers that the communication did not bear the American post-mark, we naturally feel grievously disappointed that this remarkable production is not of native growth. Still we can afford to be generous enough not to envy the outer barbarians even such a triumph as this appears to be.

The title of this communication is "The Daylight Storer; or, Edison Outdone," and if any of our readers had ever cause to doubt that truth is sometimes stranger than fiction, let them read and be convinced:

"DEAR SIR: For ten years I have been haunted by the idea of discovering a means of general illumination which will be within the reach of the poorest and explode gas forever. When I conceive a problem of this kind, I never rest until I solve it, and consequently I have never rested for ten years. The other day, while pacing my garden-walk in the twilight, pondering this subject, I spied a glow-worm in the grass. I cried out, 'Eureka!' The idea had at length burst upon me. It is this: I prepare a phosphorescent salt of lime, which by day absorbs light, and by night gives it forth again in a soft, diffused glow. I cause the walls of each room in a house to be coated with this salt for domestic illumination, and I enact that all the houses lining a street be whitewashed with it, so that as darkness comes on, the whole city, outside and in, shall be self-luminous. In this way I store up the light of day, and enable every man, for a few pence yearly, to be his own gas-works, or his own electric light. The hideousness of night is banished, and burglars are unknown. I have patented this process in every civilized and uncivilized country, notably in Africa, where, I imagine, the negroes will want to apply it to their own persons. The nature of the salt will be revealed in due course."

A NOVEL AND SIMPLE METHOD OF TAKING SPECIFIC GRAVITIES.

M. Gannal has recently devised a means of determining exactly, and with the greatest facility, the specific gravity of all liquids.

With his "*densimètre hydrostatique*," all calculation is obviated, and the specific gravity is ascertained by simply reading the weight on the balance.

This useful and ingenious apparatus is made in the form of an *olive*, so that bubbles of air shall not attach themselves to its sides.

The olive (whether made of glass or metal) has a volume exactly equal to one decimal subdivision of a cubic meter. There are two different methods employed in the practical use of the apparatus:

1st. We may suspend it on the platform of the balance, and, after having produced an equilibrium, we plunge it into the liquid; the equilibrium is then destroyed by the loss of weight of the olive, and the number of grams which it is necessary to add to the scale-pan to restore the equilibrium is the exact specific gravity of the liquid.

2d. Or we may equally well adopt the following plan: We put the liquid whose specific gravity we desire to ascertain in a glass vessel on one pan of the balance; we balance the scale-pans, and then suspend the olive in the liquid by means of a fine thread. The equilibrium is destroyed, and the scale descends on the side on which the olive is suspended, and the weight—which it is necessary to place in the other pan to restore the equilibrium—is equal to the specific gravity of the liquid.

This apparatus will determine the density of all liquids, whether they be heavier or lighter than water, whether they be acids, alcoholics, thick or syrupy. It advantageously supersedes the areometers; it is not fragile, and it gives the indications with an exactitude depending on the sensibility of the balance employed. The work is reduced to a simple weighing and reading of the weights on the balance.

M. A. Gannal has constructed instruments of 100 cubic centimeters, and 10 cubic centimeters only. The larger apparatus is the one which will prove the most convenient and the most needed in commercial and industrial determinations. With this instrument, and a balance sensitive to one decigram, we may determine the density to the thousandth degree.—*Les Mondes, trans. in Jour. Franklin Inst.*

ELECTRIC LIGHTING.*

By J. Jamin.

The author reviews the most important steps in the progress to the present condition of electric lighting. While the various magneto and dynamo-electric machines leave little to be desired, the construction of the regulators or lamps is incomplete, and these have not found a substitute in the Jablochkoff "candle," which, although possessing the advantage of simplicity, requires the use of machines producing alternate currents, and does not relight itself automatically when once extinguished, as do the lamps or regulators. The electric light and sunlight are equally under the disadvantage that the rays are too powerful to be borne by the naked eye without injury. The author discusses the method of sub-

* Abstract of a paper in the *Revue des Deux Mondes*, vol. xxvi., pp. 281-303. From the Proceedings of the Institution of Civil Engineers of London, edited by James Forrest, Secretary.

dividing the light, as proposed by MM. Le Roux, Jablochkoff, and Kind.* Le Roux's method consists in alternately directing the current into several regulators so that the duration of the current in each is reduced to the twenty-fifth of a second, giving an apparently continuous light. Jablochkoff's method consists in charging a series of condensers, to each of which a lamp is connected; and Kind's method, in heating to incandescence by the current a series of single carbon rods of small diameter.

The author points out that light produced from a machine giving alternating currents is attended with an inconvenient singing noise, from which continuous-current machines are free.

Light from an electric source is less marked in its heating effect upon the atmosphere than is gas, although evolving at the luminous focus a very much greater amount of light, and the author explains that this may be due to the want of calorific character in intense light rays. The vitiating effect of the electric light is incomparable with that from a system of gas lighting.

As to the cost of electric lighting, the author considers that the statements of electricians and of gas engineers are biased for and against. He believes, however, that the truth is represented by the offer of the Compagnie Lontin, who are willing to supply complete apparatus (which remains their property) and to maintain the electric light at a cost of 50 centimes per 100 (carcel) burners; also by the statement of a proprietor in the Magazins du Louvre who estimates the cost of electric lighting with the Denayrouze-Jablochkoff system at 30 per cent less than the cost of gas.

OUR IRON MINES AND THEIR PRODUCTS.

From the *Marquette Mining Journal* of the 30th ult. we condense the following:

"Shipments of iron ore from the Lake Superior region up to the close of November, which is practically the end of the season, were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
L'Anse	42,186	59,571	D. 17,385	29·2
Marquette	552,127	521,743	I. 30,384	5·8
Escanaba	506,893	383,743	I. 123,150	32·1
Total	1,101,206	965,057	I. 136,149	14·1

"During the season just closed the Marquette, Houghton, and Ontonagon road carried 618,600 tons iron ore, 8134 tons pig-iron, and 3192 tons quartz and limestone. The Peninsula Division, Chicago and Northwestern, carried 523,244 tons iron ore, 2443 tons quartz and 2270 tons pig-iron. In addition to the water shipments, above 23,785 tons of iron ore were shipped by rail, making a total for the season of 1,124,991 tons. Pig-iron shipments from Marquette for the season were 8240 tons."

The total shipments from the Menominee range mines for the season, up to the 20th ult., exclusive of ore forwarded by rail, aggregate 82,662 tons.

Five of the principal iron mines of this county will aggregate a product of 550,000 gross tons of ore the present year. We doubt if there are the same number of mines elsewhere in the world, no matter how far apart, that can make as good a showing.

The McComber mine has closed the season with a product of over 25,000 tons, as shown by the amount of lake shipments. In this product are included several thousand tons of manganese ore, which commands a considerable advance in the market, as compared to the prices paid for our hematites.

The Republic mine has completed its shipments, closing with a grand total of 176,223 gross tons. This is the largest product ever achieved by any mine in the district, in one year, with the single exception of the Lake Superior, which shipped in 1872 185,070 gross tons.

Large quantities of white manganese ore are almost daily found in the mines on the hematite hills of Negaunee.

NEW YORK IRON MINES.

The Chateaugay ore beds are unusually busy. The new engine-room is finished, and with the engine ore will be hoisted at the rate of 250 tons a day. About 3000 tons are to be shipped to Clayburg, and also a large quantity to Altoona, Pa.

The Cedar Point Iron Company, Port Henry, has orders enough on hand to keep it running till June next. The new furnace, it is estimated, will require 1400 tons of limestone to keep it running through the winter.

The Port Henry iron interest has taken a buoyant turn, the Cedar Point Iron Company having received a contract for all the Bessemer pig that it can produce in its furnaces from now till next June.

One hundred men are employed in the Jefferson Iron Company's mines, near Antwerp, at $1 a day.

The people in the Ohio iron region are hoping for better times. The Belfont furnace, of Ironton, has resumed work, and it is believed that the Kelly charcoal furnace and Etna Iron Works will start soon. Other large works at different points are also expected to resume operations.

The Katahdin (Maine) Iron Works are preparing to start up.

DISCOVERY OF IRON ORE NEAR PUEBLO, COLORADO.—The Pueblo *Chieftain* says with reference to the recent discovery of iron ore near that city: "The firm controlling this property have taken out about sixty-five tons of iron ore, which, according to assay, will average sixty per cent iron. We saw a specimen taken from one of the lodes which is said to assay seventy-two per cent. This ore is much more easily worked than any other iron ore heretofore discovered in Colorado, and for fluxing purposes in the reduction of silver ores, is unsurpassed. It melts readily in a crucible, without any flux whatever, and the iron obtained is almost malleable. The ore is what is known as kidney hematite, and can be furnished here seventy-five per cent cheaper than either Cañon City or Trinidad ore. On the claims which have been staked the assessments for this year have been nearly all worked, and they are all properly recorded in the office of the county clerk. A movement is on foot, with a fair prospect of success, to locate blast-furnaces here to work this ore."

The Greenup (Ky.) *Independent* says that the Brownsport (Tenn.) charcoal furnace, situated three miles from the Tennessee River, claims to make iron at $11, as follows:

2 tons iron	$2.50
¼ ton limestone	15
135 bushels charcoal, at 4 cents	5.40
Labor and superintendence	2.75
Repairs	20
Total	$11.00

THE IRON INTERESTS OF OHIO.—The following interesting statistical information concerning the iron industry of Ohio is condensed from the forthcoming report of Hon. W. J. Walls, State Commissioner of Labor Statistics:

The table is prepared to show the growth of the present blast-furnace industry of the State. The dates and figures are taken from public records and data prepared by old furnace men:

Year.	Stacks erected during year.	Total stacks.	Inc. capacity for year.	Total capacity at end of year.	Year.	Stacks erected during year.	Total stacks.	Inc. capacity for year.	Total capacity at end of year.
1829	1	1	4,500	4,500	1860	3	46	30,000	263,800
1832	3	4	12,000	16,500	1861	1	47	10,000	273,800
1833	3	7	11,300	27,800	1862	1	48	6,000	279,800
1834	2	9	8,500	36,300	1863	1	49	6,000	285,800
1837	1	10	4,000	40,300	1864	2	51	14,000	299,800
1839	1	11	4,500	44,800	1865	2	53	11,000	310,800
1844	1	12	4,000	48,800	1866	5	58	35,000	345,800
1845	2	14	11,000	59,800	1867	4	62	52 000	397,800
1846	3	17	22,500	82,300	1868	5	67	59,500	457,300
1847	1	18	4,000	86,300	1869	3	70	35,000	492,300
1849	1	19	4,000	90,300	1870	4	74	41,500	533,800
1850	1	20	12,000	102,300	1871	3	77	33,000	566,800
1851	1	21	4,000	106,300	1872	6	83	80,000	646,800
1852	2	23	8,000	114,300	1873	3	86	34,500	681,300
1853	4	27	17,000	131,300	1874	4	90	43,000	724,800
1854	11	38	61,500	192,800	1875	5	95	43,500	767,800
1855	1	39	6,000	198,800	1876	3	98	32,000	799,800
1856	1	40	5,000	203,800	1877	11	109	95,000	894,800
1859	3	43	30,000	233,800					

Furnaces not included in the foregoing table were erected in the years 1826, 1827, 1836, 1842, 1846, 1853, 1855, and 1856, a total of nine, all in the Hanging Rock region, all of which have been dismantled.

According to the foregoing table the producing capacity of the blast-furnaces of the State is, in round numbers 900,000 tons annually, while the production has barely equaled half the capacity during the past few years.

The number of present employés aggregates 5160 for the 53 furnaces in operation, and 4015 employés necessary to put in operation the other 56 furnaces that are now out of blast. The 5100 do not represent all the employés, as some of the furnaces purchase their coal and ore, and the producers thereof are not counted by the furnace proprietors in making their returns to the Bureau.

ELECTRIC BREVITIES.

ELECTRIC SPARK PEN.—An electric spark pen for producing engravings on copper or zinc has been invented by M. Bailey, of Paris. The light of the spark also guides the artist in a dark room.

THE BROOKLYN ELECTRIC LIGHT CO.—This company filed a certificate of incorporation in the County Clerk's office on the 16th inst. The capital stock of the company is fixed at $2,500,000, in shares of $100 each. The charter is for a period of 50 years, and the territory over which the company will operate is the whole of Long Island, Coney Island, and Shelter Island.

RAILWAY BLOCK-SIGNALING BY ELECTRICITY.—The block system may be considered as all but perfected when the signals can be operated by electricity, and this by the train entering a section, and further, when the system is applied to the switch-signal. All this, it appears, is accomplished by the block-signals put up by the Union Electric Signal Company, on the Fitchburg (Mass.) road.

ELECTRIC LIGHT BY INCANDESCENCE.—The principle of lighting by incandescence of a very small bar of carbon in a sealed glass vessel from which the oxygen has been expelled, is being used in a merchant's warehouse in St. Petersburg, and gives satisfaction, but proves dearer than gas. As early as 1845 a mode of lighting by incandescence for which an English patent was refused, showing it had been previously invented, had a burner of a continuous carbon, heated to brilliant whiteness by the passage of the electric current. The light was produced in a glass tube in which a vacuum had previously been created, the object of this being to prevent the combustion of the carbon or metal by the oxygen of the air. It created, however, an agitation among gas shareholders for four years equal to that lately produced by Edison's announcement.

NOTES.

THE TELEPHONE IN MINES.—We note that Comstock mines have generally adopted the telephone as a means of communication from one mine to another, between the various levels, and between the different mines and their offices. Some of the California mines have telephone lines of from 20 to 30 miles in length.

ENCOURAGING PROSPECTS FOR OUR SOUTH AMERICAN TRADE.—The special agent who was sent to South America in December, 1877, by the State and Post-Office Departments to inquire into the condition of the commercial and postal affairs of the South American States, with a view to establishing closer international relations with the United States, has returned, and has submitted reports to the Secretary of State and the Postmaster-General. In his report to the Secretary of State, Mr. Frolick says in substance: That an immense trade is open to the United States on both the Atlantic and Pacific coasts of South America. American steamship lines are looked upon with favor, and several states are ready to extend aid in establishing them.

THE COMPASS.—It is commonly believed that the mariner's compass was introduced into Europe in the fifteenth century, but it seems to have been well-known in a primitive form in the twelfth and thirteenth centuries. In one of the popular songs written in the time of King John, it is related

* Query, King or Konn.—P. H.

that the sailors who went on long voyages to Friesland or to the East knew their way by observing the polar star, but, when the sky was covered with clouds, and they could no longer see the stars of heaven, they had a contrivance which consisted of a needle of iron put through a piece of cork so that one end remained out. This they rubbed with the loadstone, and then placed it in a vessel of water, and the needle pointed without error to the polar star. This formed a primitive but fairly perfect mariner's compass.

RECORD OF NEW RAILROAD CONSTRUCTION.—The *Railroad Gazette* of December 20th and 27th contains information of the laying of track on new railroads as follows:

Viroqua.—The first track is laid from Sparta, Wis., southward to Malvina, 13 miles.

Southern Pacific.—Extended from Yuma, Arizona, eastward to Gila City, 23 miles.

Georgetown.—Completed from Georgetown, Tex., east by south to Round Rock, 20 miles.

This is a total of new railroads of 2263 miles completed in the United States in 1878, against 2019 miles reported for the corresponding period in 1877, 2278 in 1876, 1333 in 1875, 1844 in 1874, 3630 in 1873, and 7160 in 1872.

CORPORATIONS FORMED ON THE PACIFIC COAST.—Mr. Sonntag, who is connected with the License Collector's office at San Francisco, has prepared a list of the companies incorporated in California during the two months ending November 30th, 1878, for commercial and mining purposes. The following is the result of his labors: During the two months 132 companies were incorporated, as follows: California, 80; Nevada, 30; Arizona, 11; Dakota, 4; Wyoming, 1; California, Nevada, and Arizona, jointly, 6. These are classified into commercial and mining companies as follows: Commercial, 12—California having 11, and the Hawaiian Islands (Hawaiian Land Company, Claus Spreckles & Co.), 1—with an aggregate capital of $11,139,680, of which the Hawaiian Land Company has $10,000,000, and the others $1,139,680. The mining companies number 120, as follows: Dakota, 4, with a capital stock of $15,000,000; Wyoming, 1, $15,000,000; Arizona, 11, $76,000,000; Nevada, California, and Arizona, 6, $63,000,000; Nevada, 30, $223,250,000; Calfornia, 68, $316,323,000. Total, $708,973,000; aggregate total of all the incorporations, $719,712,680.

FREIGHT RATES ON IRON ORE AND PIG-IRON.—The Pittsburg *Telegraph*, in reviewing this subject, says: "During the years 1871, 1872, and 1873, the rate on ore from the ports on Lake Erie to Pittsburg was $2.80 per ton of 2000 lbs. In 1874 it was reduced to $2.50 per ton, and during the succeeding three years the rate was reduced to $2 to the blast-furnaces, while rolling-mill firms were still charged $2.50. About a year ago the rate was reduced to $1.50 per ton, at which it now stands. In addition to these charges there has always been a charge for dockage and handling at the point of shipment, and another for switching here, amounting to 40@50c. per ton. The total charges to furnaces here at present is $1.90, or $2.10 per gross ton of 2240 lbs.

Prior to September, 1871, the charges on Lake Superior ore from the lake ports to Youngstown, Ohio, were $1.50 per ton, with 25 cents for dockage and hauling additional. At that date the charge was made $1.50 net. In May, 1874, the charge was reduced to $1.25 per gross ton, the next year to $1.20, 1876 to $1.10, and last year $1. These data enable us to make the following comparisons of the freights on ore from the lake ports, including terminal charges. The rates per ton of 2000 lbs. are as follows:

1871-3.		1876-7.	
To Pittsburg	$3.30	To Pittsburg	$2.35@2.85
To Youngstown	1.50	To Youngstown	1.10
1874-5.		1877-8.	
To Pittsburg	$2.50@2.95	To Pittsburg	$1.90@2.00
To Youngstown	1.20@1.25	To Youngstown	1.00

The rates on pig-iron for gross ton of 2240 pounds from Youngstown to the two cities compare as follows for the past five years:

To Pittsburg, June 18th, 1873, to August 30th, 1876	$1.81
To Cleveland, previous to May, 1874	1.65
To Cleveland, May, 1874, to January, 1875	1.37
To Cleveland, January, 1875, to January, 1876	1.32
To Pittsburgh, August 30th, 1876, to February 15th, 1878	1.45
To Cleveland, in 1876	1.21
To Cleveland, in 1877	1.10
To Pittsburg, during 1878	1.31
To Cleveland, during 1878	1.10

COPPER SHIPMENTS FROM PORTAGE AND TORCH LAKES DURING SEASON OF NAVIGATION, 1878.—We are indebted to the *Portage Lake Mining Gazette* of the 12th inst. for the following: "We are indebted to Mr. James Pryor, Superintendent of the ship canal and Portage Lake and River Improvement Company, for the following figures:

REFINED COPPER.

	Pounds		Pounds.
Calumet and Hecla Mining Co	22,051,010	H. Kautle	5,666
Osceola Mining Co	2,361,324	Isle Royale Mining Co	4,606
Allouez Tribute Co	1,150,702	W. E. Jones & Co	28,740
Allouez Mining Co	168,750	Seneca Mining Co	7,809
Franklin Mining Co	1,704 678	R. K. Allerton, Grand Portage Mine	34,124
Pewabic Mining Co	377,361	J. Penberthy	698
Philip Tucker	15,521	A. McIntire	978
Albany and Boston Tribute Co	2,921	P. Tucker, Shelden-Columbian Co	1,622
Albany and Boston Mining Co	194	Peter Gottstein	357
Quincy Tribute Co	7,807	Atlantic Mining Co	251,856
Samuel Sleep	6,486	Phœnix Copper Co	36,517
Houghton Mining Co	12,304	Island Tribute Co	76,038
A. Bleiss	13,678		
Steve Henan	19,041	Total refined copper	28,395,368
R. Sampson	7,154		
Michigan Tribute Co	6,387		
Harris & Smith	41,039		

STATEMENT OF MINERAL COPPER SHIPPED.

	Pounds.		Pounds.
Quincy Mining Co	3,554,210	Amygdaloid Mining Co	2,184
Atlantic Mining Co	1,962,944	Calumet and Hecla, from Torch Lake	3,491,480
Calumet and Hecla Mining Co	193,360		
Osceola Mining Co	62,435	Total	9,347,783
Franklin Mining Co	67,400		
Pewabic Mining Co	13,720		

RECAPITULATION.

Refined Copper	28,395,368
Mineral Copper	9,347,733
Total	37,743,101

"The above statement does not indicate, of course, the year's product of many of the mines mentioned. ending with the close of navigation. It simply shows the amount of ingot copper aud mineral shipped through the Portage River Improvement Canal during the season of navigation. Among the mines that shipped copper overland during the winter of 1878 were the Osceola, Franklin, Pewabic, Atlantic, Allouez, etc. The only mines outside of this county, noted in the above table, are the Allouez, Phœnix, Seneca, Island, and Amygdaloid."

THE PHILOSOPHY OF A CHIP.—Few of us who have set our lathe tool for a good "chip" and then watched the displaced metal slowly curling from the revolving shaft as the "feed" brings the iron to the point, have ever indulged in much philosophy on the form of the chip. This, however, and many other common operations of the machine-shop, have been investigated by mechanical philosophers, and we find one of them in a paper read at a meeting lately held at the Paris Exposition, discoursing as follows:

Flat surfaces are cut in the planing-machine or in the lathe, and under most circumstances the two kinds of cuttings are almost identical in appearance—that of a cylinder formed of spirals more or less close, sometimes even in juxtaposition; but for this combination it is necessary that the two edges of the cutting should have been equally reduced; that is, that they should be of the same thickness. If it were otherwise, the spirals would become conical; and such of these as appear to be most characteristic will now be described. The cutting obtained in mortising by means of a straight tool is absolutely cylindrical. When the tools cut out in this manner a rectangular groove, the material is compressed without any lateral deviation. If the cutting is of great thickness, it is triangular, and the smooth surface is formed by the combination of the three faces at which the separation takes place, the direction in which crumpling takes place being the same as in all ordinary cuttings. The triangular form is the result of the compression being greater toward the middle line. To aid in forming an opinion on this point two blocks were placed side by side, which were planed at the same time in the line of junction of the pieces. Two distant horns were formed, which parted symmetrically from one another; each half-cutting following the law of shortening by which it was bound to assume a form concave toward the side which was held by its attachment to the block. The cuttings from a lathe, when they were produced from the annular groove by means of a straight tool, assumed exactly the same forms. For example, a cutting from a groove in what is called the Swedish piston is a continuous ribbon rolled up as on bobbin with the greatest regularity and of great length, without a rent. When turnings take the form of a helix, the small lateral displacement of the piece is not large enough to give to the ribbon a different character from that of a planing-machine, when, for instance, it is required to turn a shaft to a uniform diameter, and it is then easy, with good metal, to produce cuttings of great length. But when it is required to turn the end of the shaft or of any cylinder whatever, the cutting follows a special course. If the tool be large in proportion to the diameter of the rings or circles on which it is acting, the difference of diameter between the two edges of the cutting makes itself felt in the cutting, which assumes the form of a helicoidal surface with inclined generating lines, of which the two directrices are two helices of the same pitch but of different diameters. This universal geometrical character, moreover, is manifested in special ways according to the width of the ribbon and the interior diameter of the ring. In this way three horns may be obtained incased one in the other, if the cutting of the tool be radial. Successive spirals foul each other when the direction of the cutting edge is a little inclined. The inner helix is replaced by a straight edge when the tool cuts right to the center of the face. Notwithstanding these differences of detail, the same rules prevail; a greater or less reduction or shortening according to the thickness of the cutting; a less reduction of length at the thicker edge of the cutting; a smooth surface of separation, which always forms a developable surface; a rugged reverse face ridged as if waves of metal had been successively projected there; in fact, all the circumstances of a transverse flow of material—setting apart the secondary circumstances of transformation of the prism of metal from which the cutting is produced by augmentation of thickness and corresponding reduction of length.

PETROLEUM NOTES.

COMPARATIVE SYNOPSIS OF REPORTS FOR OCTOBER AND NOVEMBER, 1878 AND 1877.

42 GALLONS = 1 BARREL.		1878.		1877.	
		October, 31 days.	November, 30 days.	October, 31 days.	November, 30 days.
Stock at the Wells	Bbls.	83,909	83,909	110,852	110,852
Production for the month	"	1,369,797	1,348,950	1,269,326	1,173,420
Daily average production	"	44,187	44,965	40,946	39,114
Iron tank stock	"	4,137,860	4,205,400	2,393,160	2,360,946
Total stock in the region	"	4,221,769	4,289,309	2,504,012	2,471,798
Shipments out of the region	"	1,747,390	1,281,410	1,268,971	1,205,634
Number of producing wells		10,188	10,276	8,061	8,323
Number of drilling wells		282	297	573	565
Number drilling wells completed		229	248	467	391
Aggregate daily production of new wells in bbls		2,878	2,963	5,273	4,302

PRICES AT LEADING STATIONS IN THE OIL DISTRICTS.

The following has been the average price paid for crude delivered free on board the cars at the loading racks during the month of November for the last ten years:

November,	1869,	average.	$5.80 per bbl.	November,	1876,	average.	$3.42¼ per bbl.
"	1870,	"	3.22½ "	"	1877,	"	2.22 "
"	1871,	"	4.25½ "	"	1878,	"	1.12 "
"	1872,	"	4.16¾ "				
"	1873,	"	1.15 "				$27.72¼
"	1874,	"	78¼ "	"	average for 10		
"	1875,	"	1.56¾ "	years			2.72¼ "

—*Stowell's Petroleum Reporter, Dec.* 16, 1878.

THE MARKET AT NEW YORK.—The *Shipping and Commercial List* of the 25th inst. reports the market as follows:

Crude.—The demand continues very light, and prices are nominal at 7⅝@8⅛c., in barrels.

Refined.—The market remains in the same dull, unsatisfactory condition, and

buyers evince but little more disposition to do business. At the close Refiners asked 8⅝c. here, and 8½c. in Baltimore and Philadelphia, but there was no bidding. We note sales of 10,000 bbls. at 8⅝c. here, and 8¼c. in Philadelphia; also, 50,000 cases on private terms; quoted 11½@11¾c.

Naphtha.—Remains quiet and nominal; quoted 8½ cents.

Residuum.—The demand continues very light, and prices are still nominal; quoted 5¾ cents, which is rather higher.

Certificates have been dull, and business on 'Change has been light, comprising only 12,000 bbls. United at 91¼@93¾ cents, regular. Oil City quiet, 92½ cents bid, strictly; Titusville weak, offered at 93⅛; Parker's quiet, offered at 92½.

LONDON, December 24.—Refined firm at 9¾d.; January and February firm at 8¼d.

ANTWERP, December 24.—Refined firm, f. 22¼.

EXPORTS OF REFINED, CRUDE, AND NAPHTHA.

	1878. Gals.	1877. Gals.
Since our last	3,429,531	
Previously since January 1st	208,637,374	232,672,353
From other ports	115,797,884	99,857,036
Total	327,864,789	332,529,389

The oil excitement at Portland (Cranberry Summit), West Virginia, continues. A correspondent of the Oakland *Herald* writes that representatives of the leading oil companies of the United States are prospecting on the ground and assert that there is every indication of the presence in large quantities of the best lubricating oil in the country. Two wells will be sunk at once, and the "bottom facts" reached shortly. In the mean time every body is jubilant, land is going up like a rocket—in price—and developments are most anxiously awaited.

GENERAL MINING NEWS.

NEVADA.

THE COMSTOCK.

The *Gold Hill News* of the 18th inst. summarizes the mining situation on the Comstock lode as follows:

"The changes exhibited on the lower levels of the mines during the week have been slight, there having been nothing to attract public attention outside of a continuation of the quartz and ore in the bottom of the Sierra Nevada south winze below the 2200 level. That winze is now down 70 feet below the 2200 level, the bottom still in the same favorable cap rock and formation so often mentioned before. At times the bottom of the winze will cut into ore to the depth of two or three feet, when it will again gradually disappear until it is all out of the winze, when it again begins to show, proving that although very regular in make and dip, the face is slightly undulating.

"At the North Consolidated Virgina shaft, the work is being pushed ahead with all the speed possible, as that must be for the future the working shaft of both the North Consolidated and the Union Consolidated mines, and will undoubtedly be, when it reaches the proper depth, the main working shaft through which the ores of the new bonanza are to be extracted.

"At the Ophir, opening the 2200 station is making good progress, and there can be but little new except a small increase in the amount of ore extracted, until every thing is in readiness to commence cross-cutting on the 2100 and 2200 levels.

"A strong flow of water has been struck in the Osbiston shaft of the Gould and Curry mine. But it is believed to be nothing more than a big pocket, and will soon be drained and the sinking resumed.

"The east drift on the 2000 level of the Hale and Norcross is steadily advancing to connect with the Chollar Combination shaft, which it will do in a very short time.

"The pumps of the Combination shaft will soon be ready to start up. When that is done, the draining of the flooded mines will take but a very short time.

"The Belcher north incline has reached the depth of 2560 feet, at which point a station set has been put in and the shaft is being continued on downward for a sump."

THE OPHIR MINING COMPANY—ANNUAL REPORT.

The annual meeting of this company was held in San Francisco on the 15th inst. From the *Stock Report* we give the Secretary's report.

RECEIPTS.

Cash on hand	$11,625.89	
Cash with superintendent	8,446.62	
		$20,072.51
Sales of ore	41,166.48	
Bullion, face value	21,560.38	
Assay samples	83.08	
		62,809.94
Assessments:		
No. 30, $1 per share	$100,800.00	
No. 31, $1 per share	100,800.00	
No. 32, $1 per share	100,800.00	
No. 33, $1 per share	100,800.00	
No. 34, $1 per share (98,100 shares)	98,100.00	
		501,300.00
California Mining Co., hoisting labor and supplies	$57,704.97	
Mexican G. and S. M. Co., hoisting power and supplies	16,940.57	
Union Con., G. and S. M. Co., hoisting power, supplies	28,159.86	
Other sales of material	801.86	
Va. and R. R. Co., rebate on freight	301.21	
		103,908.47
Total		$688,008.92

DISBURSEMENTS.

Salaries and wages at the mine		$316,815.63
Supplies and miscellaneous expenses		310,638.44
Miscellaneous		42,932.47
Cash on hand	$14,294.51	
Cash with superintendent	3,208.87	
		17,503.38
Total		$688,089.92

THE GOULD AND CURRY MINING CO. (ANNUAL REPORT).

The annual meeting of this company was held in San Francisco on the 16th inst. From the Secretary's report, as published, we take the following, showing the receipts and disbursements for the year ending November 30th, 1878:

RECEIPTS.

Assessments:		
No. 32, 108,000 shares at $1 per share	$108,000.00	
No. 33, 108,000 shares at $1 per share	108,000.00	
No. 34, 3370 shares at $1.50 per share	5,055.00	
		$221,055.00
Mine account:		
Hoisting ores and waste	13,839.60	
Pumping	28,500.66	
		42,340.26
F. F. Osbiston, Supt., balance account		22,335.50
Balance cash indebtedness		96,002.77
Total		$381,733.53

DISBURSEMENTS.

Cash indebtedness November 30th, 1877		$15,858.46
Mine supplies	24,304.63	
Mine labor and salaries	150,377.33	
Wood	104,817.00	
Lumber	10,287.99	
Machinery	44,589.65	
Osbiston shaft construction	18,000.50	
Miscellaneous	13,407.92	
		365,875.07
Total		$381,733.53

The following is condensed from the Superintendent's report:

"The main shaft has required constant attention and much work to keep it in repair, portions of the ground through which it passes being very heavy.

"In sinking the main incline, a stream of water of 155 degrees Fahrenheit was encountered, making the work difficult. It now takes five strokes per minute of the 13-inch pump to handle this water. The superintendent suggests that no attempt be made to sink the incline any deeper. First, the engine is of insufficient power; secondly, it would take a year to reach another level, and by that time he hopes to be connected on the 1700 level with the Osbiston shaft, and then much of the machinery and works at the Bonner shaft can be dispensed with. The Osbiston shaft has been sunk a distance of 345 feet, and is 22½ feet long by 9½ feet in width, and securely timbered.

"On the 1900 level a lateral drift has been run the whole length of the claim and three east cross-cuts are being run. No. 2, which is directly opposite the main incline, is in 183 feet and has just passed through the west clay. On the level above and directly over this cross-cut most favorable ground was found which leads to the hope of ore on this level.

"Although a large amount of work has been done on the 1900 level, it is by no means prospected, and the superintendent looks for favorable results in cross-cuts Nos. 2 and 3, that are now being run, as also in No. 1, that will be commenced this week. No. 1 will be a joint cross-cut, and run east and west on the Best and Belcher south line.

"From this level all prospecting will have to be done through winzes until the new shaft is down a sufficient depth to open the mine through it."

LABOR NOTES.

The miners at Pine Run, Pa., are still out for 2½ cents per bushel for mining coal.—The Lawrence Iron Works, Ironton, Ohio, are about to resume work, thus giving employment to about 400 hands.—The coal miners of Joseph Waterman & Co., Haberman's, Pa., are on strike for 2½ cents per bushel; the price worked at last was 2 cents per bushel.—The miners of Erie, Colorado, after a two-months' struggle for one dollar per ton, find themselves shut out in certain mines, their places having been taken by non-union men, while the Boulder mine has shut down for twelve months rather than pay the price.—The puddling department of the Solar Iron Works, Pittsburg, has closed, owing to the strike of the puddlers, because the proprietors had discharged a workman.—The North Chicago Rolling Mills have just taken over 400 additional hands.—The Standard copper shops in Erie, Pa., have resumed operations.—Every rolling-mill in Youngstown, O., is running double turn, with the exception of the Valley. The four rolling-mills at Niles, O., have resumed operations—The miners in the vicinity of Zanesville, O., who were out on strike, have obtained an advance of a quarter of a cent per bushel.—The steel melters at Park's Black Diamond Works, Pittsburg, Pa., have accepted the reduction offered and continue their work.—The miners of the Rostraver Coal Works, near Webster, Pa., who were on strike for $2.25 per hundred bushels, have succeeded in getting their price.—The McKeesport (Pa.) Tube Works have suspended a large number of hands, owing to a scarcity of orders.—The new guide mill at Altoona, Pa., will, when completed, employ 30 hands; the rolling-mill, running full handed, is employing 430 men.—All the works of the Pennsylvania Coal Company have been put on three-quarters time till further notice.—The contract of the Phœnix Iron Company, of Reading, Pa., for one section, four miles in length, of the New York Elevated Railway, will keep the works running to their full capacity, night and day, during the winter.

NEW PATENTS.

The following is a list of the new inventions relating to Iron, Coal, Mining Machinery, Chemical Apparatus, and the treating of Precious Metals, etc., from *The Official Gazette of the United States Patent Office*, for the week ending November 19th:

No. of Patent.	*Title of Invention.*	*Name of Inventor.*	*Residence.*
209,972	Regulator for Boilers and Furnaces	James A. Lakin	Westfield, Mass.
209,974	Steam-Engine	B. F. Montague	Dunreith, Ind.
209,984	Apparatus for the Manufacture of Salt	Henry Ransford	Brighton, Eng.
209,994	Locomotive Smoke-Stack	George W. Turner	St. Paul, Minn.
210,007	Drilling-Machine for Artesian and other Wells	Jules Garnier	Paris, France.
210,020	Working Nickel Ores and Manufacture of Nickel	Jesse Button	New York, N. Y.
210,049	Manufacture of Iron	A. J. Moxham	Louisville, Ky.
210,055	Pump	Edwin Sanders	Yarmouth, N. S.
210,058	Double-Acting Force-Pump	Ellis L. Spencer	Tama City, Iowa.
210,107	Testing-Machine	Franklin Fairbanks (a)	St. Johnsbury, Vt.
210,151	Electric Meters	William E. Sawyer	New York, N. Y.
210,153	Coal-Cart	Frederick Scholes	Brooklyn, N. Y.
210,169	Pump	John C. Titus	Marion, O.

(a) Assignor to E. & T. Fairbanks & Co., same place.

CIRCULAR FROM THE COMMISSIONER OF PATENTS.—The Commissioner of Patents has issued a circular which requires that, after January 1st, letters patent and certificates of registration must be perfected and ready for delivery upon receiving the signature of the Commissioner. It has been the practice heretofore to sign the letters patent previous to the printing of the same, thereby causing a delay to the patentee in receiving his papers.

PROPOSALS.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, with the full name and address of parties soliciting the same:

100 Two and Four-Horse Army Wagons; D. H. Rucker, Assistant Quartermaster-General U.S.A., Philadelphia, Pa	Dec.	31, 1878
Railway Construction from the Province of Ontario to the Pacific Ocean, about 2000 miles; F. Braun, Secretary Department of Public Works, Ottawa, Canada	Jan.	1, 1879
Railway Construction, 310 miles; F. Braun, Secretary of Department of Public Works, Ottawa, Canada	"	"
Bridge; Howe Truss, Iron, 650 feet long: Board of Supervisors, Wapello, Wisconsin	"	6, "
100,000 gallons Best Quality, Winter-Strained, Pure Lard Oil for U. S. Light-House Service. John Rodgers, Rear Admiral U. S. Navy, Washington, D. C	"	8, "
Gas Illumination of Rio de Janeiro, Brazil; Salvador de Mendonca, Brazilian Consul-General, 42 Broadway, New York city	March,	"
Locks and Keys for Mail Bags; D. M. Key, Postmaster-General, Washington, D. C	"	20, "
Coal for Schools of Youngstown Board of Education, Youngstown, O	"	29,

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending Dec. 21st and years from January 1st:

Tons of 2240 lbs.	1878. Week.	1878. Year.	1877. Week.	1877. Year.
Wyoming Region.				
D. & H. Canal Co.	52,149	2,076,869	60,061	1,861,617
D. L. & W. RR. Co.	43,763	2,107,606	72,985	1,997,433
Penn. Coal Co.	20,400	905,662	25,051	1,025,086
L. V. RR. Co.	18,744	819,873	19,633	889,330
P. & N. Y. RR. Co.	228	31,186	298	42,391
C. RR. of N. J.	25,408	966,111	43,459	1,340,841
Penn. Canal Co.	.....	347,599	.....	340,231
	160,692	7,254,906	221,487	7,496,929
Lehigh Region.				
L. V. RR. Co.	40,187	2,393,262	73,184	3,297,430
C. RR. of N. J.	34,527	1,328,297	40,023	1,506,017
D. H. & W. B. RR.	.....	37,848	.....	34,473
	74,714	3,759,407	113,207	4,837,920
Schuylkill Region.				
P. & R. RR. Co.	110,040	5,010,569	150,305	6,721,899
Shamokin & Lykens Val.	19,292	800,269	.....	691,342
	129,332	5,810,838	150,305	7,413,241
Sullivan Region.				
Sul. & Erie RR. Co.	1,201	36,227	634	21,010
Total	365,939	16,852,027	485,633	19,769,073
Increase	.....	.....	.....	.....
Decrease	119,694	2,917,046	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

Belvidere Delaware Railroad Report for week ending Dec. 21st:

	Week.	Year. 1878.	Year. 1877.
Coal for shipment at Coal Port (Trenton)	6	14,232	60,944
Coal for shipment at South Amboy	4,044	427,681	441,914
Coal for distribution	4,038	195,273	195,273
Coal for Company's use	1,789	82,231	82,231

Shipments of Anthracite Coal during week ending December 14th, 1878, and total for year to date, compared with corresponding time last year, as prepared by Mr. John H. Jones, Accountant of the Anthracite Board of Control.

Interests.	Week. Tons.	Week. Cwt.	Total for year to date. Tons.	Total for year to date. Cwt.
Philadelphia & Reading R.R.	91,450	13	4,867,286	11
Lehigh Valley R.R.	66,902	0	3,289,232	0
Central R.R. of N. J.	57,071	10	2,122,096	9
Del., Lack. & West. R.R.	42,556	15	2,075,238	6
Del. & Hudson Canal	44,478	10	1,935,178	19
Pennsylvania R.R	25,197	12	1,306,485	18
Pennsylvania Coal Co.	2,118	3	910,590	12
Total	329,775	3	16,506,106	15

Interests.	Corresponding time last year. Tons.	Corresponding time last year. Cwt.	Difference. Tons.	Difference. Cwt.
Phila. & Reading R.R.	6,559,405	6	D. 1,692,118	15
Lehigh Valley R.R.	4,291,599	0	D. 1,002,367	0
Central R.R. of N. J.	2,648,123	16	D. 526,027	7
Del., Lack. & West. R.R	2,003,973	10	I. 71,262	16
Del. & Hudson Canal	1,828,052	0	I. 107,126	19
Pennsylvania R.R.	1,476,818	0	D. 170,332	2
Pennsylvania Coal Co.	1,057,404	0	D. 146,813	8
Total	19,865,375	12	D. 3,359,268	17

NOTE.—The tonnage for the week on this statement is approximated from the weekly returns of the transportation companies, and is subject to adjustment each month to conform to the returns made by each interest to the Board of Control

The increase of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania railroads amounts to 99,380 tons, as compared with the corresponding period in 1877.

Receipts and shipments of coal at Chicago Ill., for the week ending Dec. 21st, and year from January 1st:

	Week. Tons.	Year. Tons.
Receipts	31,999	1,770,203
Shipments	7,908	289,482

Perth Amboy Business:	Tons.
Received for the week	24,990
Shipped for the week	11,974
On hand Dec. 21st	111,722

The Production of Bituminous Coal for the week ending Dec. 21st was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.	13,709	1,633,824
Barclay Region, Pa.		
Barclay R. R., tons of 2,240 lbs	6,540	299,420
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.	2,643	147,187
*East Broad Top	1,315	61,048
Clearfield Region, Pa.		
*Snow Shoe	491	27,791
*Tyrone and Clearfield	26,855	1,219,251
Allegheny Region, Pa.		
*Pennsylvania R. R	2,732	193,515
Pittsburg Region, Pa.		
*West Penn R. R.	3,046	177,636
*Southwest Penn. R. R.	461	22,903
*Penn & Westmoreland gas coal, Pa. R. R.	17,455	659,808
*Pennsylvania R. R.	7,773	411,893

*For the week ending Dec. 14th.

The Production of Coke for the week ending Dec. 14th:

Tons of 2000 lbs.	Week.	Year.
West Penn R. R.	2,491	83,310
Southwest Penn. R. R.	15,773	756,151
Penn. & Westmoreland Region, Pa. R. R.	1,934	74,644
Pittsburg, Penn. R. R	2,829	112,074
Penn. R R. (Allegheny Region)	1,408	2,490
Total	24,435	1,028,669

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 27, 1878.

Anthracite.

The business of the week has been very much reduced by the advent of Christmas and the approach of the end of the year. Prices have been about equivalent to those received at the auction sale last week. The very cold weather of the past week has brought about a large consumption of domestic sizes, and both dealers and producers feel greatly encouraged on this account.

Although there has been but little hope that any thing would be done toward forming a coal combination for 1879, yet there has been a degree of uncertainty on the subject, and buyers have been waiting for somebody to begin the fight, expecting that prices must decline still further. Owing to this feeling, purchases are only being made to supply pressing necessities.

To-day the Board of Control met in this city and decided that the members of the combination had done what they agreed to, and that there were no penalties to be paid. The Lehigh Valley Railroad Company had no representation to negotiate for a combination for next year, so the present arrangement was permitted to expire peacefully. *Requiescat in pace!* This action being expected by most of those in the trade, it has had no effect upon the market.

The following resolution was passed:

Whereas, The present meeting convened for the purpose of making some arrangements for the management of the anthracite coal trade for the year 1879, and full notice thereof has been given to the representatives of the Lehigh region; and

Whereas, No representative of the Lehigh operators or of the Lehigh Valley Coal Company is present; and

Whereas, It is utterly useless to make any arrangement for the management of the trade without the active co-operation of the Lehigh Valley operators, including the Lehigh Valley Coal Company,

Resolved, That this meeting now adjourn *sine die*.

The Philadelphia and Reading R. R. Co. has issued the following circular:

CIRCULAR NO. 14.

PHILADELPHIA, December 23, 1878.

Anthracite coal on hand at Port Richmond when Spring rates of 1879 are announced, will have the benefit of said rates. FRANKLIN B. GOWEN, President.

The production of anthracite coal last week was 365,939 tons, as against 336,743 tons the previous week, and 485,633 tons the corresponding week of 1877. The total production from January 1st to December 31st was 16,852,027 tons, as compared with 19,769,073 tons for the like period of last year, showing a falling off this year of 2,917,046 tons.

Bituminous.

As is usual at this time of the year, there is nothing worthy of note in the business doing. The very cold weather that has prevailed during the past few days is likely to interfere with shipments, owing to an accumulation of ice at some of the shipping ports.

New York.

Wholesale Prices of Bituminous Coal.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
DOMESTIC GAS COALS.		
Westmoreland and Penn.	$4.25	.....
At Greenwich, Philadelphia	.....	$5.50
At S. Amboy	5.00	5 50
Kanawha at Richmond	4.10	5.40
Red Bank Cannel, Pa., at Philadelphia	8.00	8.50
Youghiogheny, Waverly Co., at Balt	4.00	5.65
Despard, West Va.	4.50	6 00
Murphy Run, West Va., at Baltimore	3.75	5.85
Fairmount, West Va., " "	3 75	5.70
Newburg Orrel. Md. " "	3.75	6.00
Cannelton Cannel, West Va	.....	10.00
" Splint " at Richmond	6.00	7.00
" Gas Coal at Richmond	4.00	5.65
Peytona Cannel, W. Va., at Richmond	.....	10.00
MANUFACTURING AND STEAM COALS.		
Cumberland at Georgetown and Alexandria	2.75@2.90	4.35@4.50
Cumberland, at Baltimore	2.90@3.00	4.35@4.50
Cl'rfi'd "Eureka" and "Franklin."		
At mines	0.75	.....
At Baltimore	3.25	4.50
At Philadelphia	3.25	4.50

FOREIGN GAS COALS.	Sterling.	Am. cur'ncy
Newcastle, at Newcastle-on Tyne	7s.6d.	$2 50@ $3.50
Liv. House Orrel, at Liv.	25s.	13.00
Ince Hall Cannel "	35s.6d.	18.00
" Gas Cannel "	25s.6d.	10 00@ 10.50
Scotch Gas Cannel, at Glasgow, nominal	25s.	7 50
	Gold.	
Bl'k House, at Cow Bay, N.S.	$1.75	$4.50
Caledonia, at Pt. Caledonia	1.50	4.25
Glace Bay at Glace Bay	1.50	4.00
Lingan, at Lingan Bay	1.50	.....
Intern'l Mines, at Sydney	1.75	4.50
Pictou, Vale Mines, at Pictou	2.00	4.70

Wholesale Prices of Anthracite Coal Delivery f. o. b. at Tide Water Shipping Ports, per ton of 2240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.	$	$	$	$	$	$
‡Lackawana, at Weehawken	.....	.....	.....	.....	.....	.....
*Pittston, at Newburg	.....	2 60	2 60	2 60	3 05	2 60
L. Val. Coal Co., at Amboy	.....	.....	.....	.....	.....	.....
Wilkes-Barre at Pt. Johnson	2 60	2 60	2 70	2 85	3 20	2 60
Plymouth Red Ash at Port Johnson	.....	.....	2 70	2 85	3 30	2 60
Swoyers at Eliz. Pt. or S. A.	2 60	2 60	2 60	2 75	3 20	2 60
LEHIGH COAL.						
‡L. V. Coal Co., at P. Amboy	.....	.....	.....	.....	.....	.....
Cross Creek, at Port John.	3 00	3 00	3 00	3 00	3 20	2 60
Buck Mount. Vein at Elizabeth Port or S. A.	3 50	3 00	3 00	3 00	3 20	2 60
Hazleton at Amboy	4 00	.....	3 75	.....	3 90	3 40
Mount Pleasant at Hoboken	3 75	.....	3 25	3 25	3 25	2 75
Hazleton at Hoboken	3 75	.....	3 25	3 25	3 25	2 75
SCHUYLKILL COAL‡						
At Pt. Richmond, Phila.						
Hard White Ash.	3 50	3 50	3 50	3 55	3 95	3 40
Free-burning W. Ash.	.....	.....	3 40	3 50	3 95	3 30
Schuylkill Red Ash	.....	.....	.....	3 75	4 00	3 30
Lorberry	.....	.....	3 80	3 95	4 00	3 40
Lykens Valley Vein	.....	.....	3 80	3 95	4 00	3 60
†*Alongside in N.Y. Harbor.*						
Hard White Ash	4 20	4 20	4 20	4 20	4 40	3 80
Free-burning W. Ash.	.....	.....	3 90	4 05	4 40	3 80
Schuylkill Red Ash	.....	.....	.....	4 35	4 50	3 90
Lorberry	.....	.....	.....	4 60	4 60	4 25
Lykens Valley Vein	.....	.....	4 60	4 70	4 70	4 35

* Forty cents per ton additional for delivery in New York.

† On coal delivered f. o. b. at the Philadelphia and Reading Coal and Iron Co.'s Wharf at Williamsburg, the current rate of harbor freight will be allowed from the prices here given.

‡ Quotations nominal.

Retail Prices.

Per ton of 2000 lbs.

Anthracite.

	G. & Egg.	Stove.	Chest.
Pittston coal delivered	$5.00	$5.00	$5.00
Lack. coal, delivered below 59th St.	4.50	4.75	4.50

Bituminous.

Liv. House Orrel	$18.00	American Orrel	$11.00
Liv. House Cannel	18.00	Red Bank Cannel	7.00
Am. "	11.00	Cumberland	9.00
Ca'n'lt'n Bl'k, or splint.	10.00		

Buffalo. Dec. 26, 1878.

[Specially reported by LEE & LOOMIS.]

Connellsville coke, gas, steam, and Cannel coals are offered, for the present, at the following prices per ton of 2000 lbs., delivered at Buffalo:

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville coke	$4.75	.....	.....	.....
Brookfield Coal	3.75	.....	.....	.....
Briar Hill	3.50	.....	.....	.....
" " No. 2	3.15	.....	.....	.....
Youghiogheny	3.75	.....	.....	.....
Monterey	.....	.....	.....	.....
Catfish	3.10	2.60	2.25	1.85
Stoneboro	.....	2.60	2.25	1.85
Sterling Cannel	4.50	.....	.....	.....
Cameron	.....	2.80	.....	.....
Buffalo Coal Co.	.....	2.60	.....	1.85

Terms, equal to cash in New York city funds.

Cincinnati. Dec. 24, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

Per bushel of 72 lbs.

	Retail delivered.	Wholesale afloat.
Youghioghney	11c.	7½c.
Camden	9c.	5½c
Cannel	17@18c.	13c

Anthracite, delivered, $7@$8 per ton of 2,000 lbs.

Hamilton, Ont. Dec. 24, 1878.

[Specially reported by H BARNARD.]

Retail prices delivered per ton of 2000 lbs.

cr. or Wilkes-B. Grate.	$4.75	Lehigh Lump.	$6.00
" " Egg	4.75	Brier Hill	5.00
" " Stove.	5.25	Massillon	4.50
" " Nut.	4.75	Smithing	5.50

From wharf or yard to the trade, 50c. per ton additional. Afloat by cargo per canal barge, 15c. per ton less than in cars at depot.

Montreal. Dec. 24, 1878.

[Specially reported by Messrs. Robert C. Adams & Co.]

Wholesale per 2240 lbs.

Scotch Steam	$4.50	Cape Breton Steam	$4.00
Pictou	4.25	Newcastle Smith's	5.00

Anthracite at retail, per 2000 lbs. delivered.

Stove	$6.50	Chestnut	$6.00
Egg	6.25		

New Orleans. Dec. 24, 1878.

[Specially reported by Messrs. C. A. Miltenberger & Co.

PITTSBURG COAL.

At wholesale (by boat-load).....27@30c. per bbl. of 180 lbs.
To steamboats.....45c. " "
" manufactories.....45c. " "
" families.....50c. " "
In hhds. (for shipment).... $5.00 per hhd from 5 to 6 bbls.

ANTHRACITE COAL

Per ton of 2000 lbs.

At wholesale.....$6.00 to $7.00
To families etc.....8 50 to 9.00

ST. BERNARD (KY.) COAL.

To steamboats.....40c. per bbl. of 180 lbs.
" families.....45c. " "
Virginia cannel at retail.....85c. " "

Pittston, Pa. Dec. 24, 1878.

Pennsylvania Coal Company's Coal in Yard.

Retail per ton of 2,000 lb.

Lump, Egg, and Stove	$2.25
Chestnut	2.00
Pea	1.00

Delivered, 50 cents per ton additional.

Richmond. Dec. 24, 1878.

[Specially reported by S. H. Hawes, Dealer in Coal.]

Per ton of 2240 lbs. f.o.b.

Kanawha Cannel	$9.00	New River Bituminous	$3.30
Coalburg Splint	4.50	Clover Hill Coal	2.50
Lewiston	4.50	Norwood Gas and	
Kanawha Gas Coal	4.10	Steam Coal	2.70

Sandusky. Dec. 24, 1878.

[Specially reported by Messrs. Black & Clarke, Agents Con. Coal and Mining Company.]

Per ton of 2000 lbs.

ANTHRACITE.

	Grate.	Egg.	Stove.	Chest
Lehigh	$6 00	$6.00	$6.25	$5.75
Wilkes-Barre	4.80	4.90	5.15	4.65
Pittston	4.80	4.90	5.15	4.65

BITUMINOUS.

Massillon	$2.85	Straitsville	$2.00
Hocking Valley	2.50	Piedmont	1.54

Prices retailed delivered 50c.@75c. above car prices.

San Francisco. Dec. 19, 1878.

Coal.—Imports from January 1st to December 1st, 1878:

	Tons.		Tons.
Anthracite	23,564	English	43,058
Australian	128,150	Mt. Diablo	89,320
Coos Bay	29,718	Rocky Mou tain	371
Cumberland	8,044	Ione	665
Bellingham Bay	3,750	Carbondale	3,125
Vancouver Island	119,185	Ounalaska	450
Seattle	104,430	Carmen Island	109

The market is poorly stocked with Australian, Scotch, and English, but is overstocked with anthracite, and for this latter the demand is extremely light and prices both low and nominal. Cumberland is also in full stock and the trade well supplied at low figures. Scotch Splint and West Hartley are called for this cold weather, and would sell readily at an improved price. Wallsend and other kinds of steam from New South Wales are in limited stock, and a few cargoes could now be placed to good advantage. The Victoria (V. I.) mines are now reaping a good harvest for their Wellington coals for household purposes; the price is $9 to the trade. Nanaimo is taken by steamers and railroads at $7. Seattle arrives quite freely and sells readily ex ship at $7 and upward. The Mary Glover brought 1000 tons; Landseer, 1925 tons; Majestic, 1750 tons, all three ships from Seattle; from Nanaimo the Rosie Welt brought 950 tons; Bride, 550 tons Wellington. The California supply from the Mt. Diablo mines for steam purposes is free at $4.50@$5.50. A fair supply of Coos Bay is now upon the market at $7. The ship Baring Brothers, from Nanaimo, has 3300 tons. The Arcata, from Coos Bay, 350 tons.—*Commercial Herald.*

St. Louis. Dec. 24, 1878.

Reported by James J. Sylvester, Secretary of the Anthracite Coal Association.]

Retail prices, delivered. Ton of 2000 lbs.

ANTHRACITE.

	Per ton.		Per ton.
Lackawanna	$7.50@	Lehigh	$8.50@
Wilkes-Barre	7.50@	Connells. Coke.	6.00@
Schuylkill	7.50@	Blossburg	7.75@

Dec. 24, 1878.

[Specially reported by Messrs. Lewis P. Harvey & Co.]

BITUMINOUS.

Big Muddy	$3.65	Piedmont	$7.25
Indiana Block	3.25	Pittsburg	4.35
Illinois Coals	2.25@2.50	Peytona	7.50
Blossburg	7.75	Lehigh Val. Ant.	7.50@8.00

Toledo. Dec. 24, 1878.

[Specially reported by Messrs. Gosline & Barbour.]

We quote the following as the present prices for coal, f. o. b. on cars here, per ton of 2000 lbs.:

Ton of 2000 lbs.

	Grate.	Egg.	Stove.	Chest.
Pittston	$5.05	$5.15	$5.40	$4.90
Wilkes-Barre	5.05	5.15	5.40	4.90
Lackawanna	5.05	5.15	5.40	4.90

Lehigh lump, $6.00.

Ton of 2000 lbs.

Straitsville lump	$2.60	Massillon nut	$2.40
" nut	2.25	Willow Bank lump	2.85
Shawnee lump	2.60	" nut	2.40
" nut	2.25	Cumberland	5.00
Hocking Valley lump	2.60	Blossburg	4.60
" nut	2.25	Morris Run	4.60
Massillon lump	2.85	Gas Coal	3.25

Retail prices, delivered in the city, are: Stove. $6.00; Grate, Egg, and Chestnut, $5.75.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to Dec. 26th, 1878.

Ports.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Alexandria	97½@1.00		
Albany			
Allyn's Point	1.30		75
Annapolis	60		
Baltimore	50		
Bangor, Me			1.50
Barnstable			
Bath, Me			
Boston, Mass	1.40@1.50	1.75	1.25
Braintree			
Bridgeport, Conn.		1.45	65
Bristol, R. I	1.30		75
Brooklyn	85		
Camden, Me			1.30
Cambridge, Mass.			1.50
Charleston	1.10@1.25		
Chelsea			
Charlestown			1.50
Cambridgeport			1.50
Danversport			1.75
East Cambridge			1.50
East Boston			1.25
Eliz'b'th City, N.C			
Fall River		1.50	90
Georgetown			
Gloucester			
Hackensack			
Halifax			1.50
Hartford		2.00	
Hingham			1.50†
Hoboken		1.10	
Hudson			
Hunter's Point	85		
Jersey City		1.10	
Key West	2.50		
Lynn			1.50†
Marblehead			
Middletown			
Newbern			
New Bedford			85
Newburyport		2.00	1.50
New Haven	1.05†	1.45	65
New London		1.45	70
Newport	1.30		75
New Rochelle			
New York	85@95	1.30	
Newark		1.40	
Norfolk, Va	65		
Norwich		1.50	80@90
Norwalk, Conn		1.40	
Pawtucket			1.00
Petersburg			
Philadelphia		60	
Port Eades			2.50
Port Royal			
Portland		1.80	1.00†
Portsmouth, Va	70		
Portsmouth, N.H.	1.55	1.85	1.50
Providence		1.50	80
Richmond, Va	85		80
Saco			2.00
Sag Harbor			
Salem, Mass		1.80	1.25
Savannah	1.25		
Somerset			75
St. John, N. B			1.00
Trenton		1.25	
Troy			70
Wareham		1.60	
Washington			
Williamsburg			
W'lmington, Del.		60	
Yarmouth, N. S.			

* And discharging and towing. † And discharging. ‡ And towing. § 3 cents per bridge extra.

Alexandria and Georgetown to Boston, 1.85@2.00.

Perth Amboy to Boston, 1.25.

Ocean Freights.

Ocean Freights on coal, iron, etc., per ton of 2000 lbs. to and from foreign and domestic ports, for four weeks ending Dec. 24th, 1878, are given below.

Date.	From	To	Cargo.	R'te
Nov. 26	San Francisco	Departure Bay	Coal	3.00
" 29	Perth Amboy	City Point	RR. iron	1.00
Dec. 3	New Haven	Philadelphia	Rails	1.50
" 3	Elizabethport	Richmond	Pig-iron	80
" 6	New York	Bremen	Salt	25s.
" 6	Perth Amboy	Port Royal	RR. iron	1.85
" 6	New York	Richmond	Iron ore	1 00
" 7	Philadelphia	St. Thomas	Coal	2.65
" 7	Philadelphia	Havana		1.50
" 13	Woods' Hole	Pensacola	Guano	1.60
" 13	Baltimore	Acapulco	Coal	8.50
" 17	Boston	San Francisco	Iron	†
" 24	Trapani	Boston	Salt	9s.
" 24	New York	Port Royal	RR. iron	1.75
" 24	New York	Richmond	*	90
" 24	New York	Boston	Pig-iron	1.50

* Steel rails. † $10@$12.

IRON MARKET REVIEW.

New York, Friday Evening, Dec. 27, 1878.

American Pig.—There is no business worthy of note doing. Prices are unchanged. It is said that some holders of Allentown iron are showing an anxiety to sell, and that some of this brand has been offered very low. At the present time it is difficult to tell what the new year will bring forth. It is now the time for making up the accounts for the year, and as some of them will, without doubt, make a very bad showing, it is not improbable that prices will be advanced or some furnaces blown out. We quote No. 1 foundry at $16@$18; No. 2 foundry, $15@$17, and forge, $14@$15.

Scotch Pig.—There is but a very small retail business doing. We quote Coltness at $22@$22.50, and Eglinton at $19.50@$20.

According to the circular of Messrs. John E. Swan & Brothers, of Glasgow, bearing date of December 13th, we learn that there were 92 furnaces in blast, as compared with 88 a year previous. The quantity of iron at Connal & Co.'s stores was 199,353 tons. Shipments to December 7th showed a falling off of 50,591 tons, as compared with shipments to same date in 1877 while the imports of Middlesbrough iron in the same comparison showed a falling off of 11,432 tons. The leading brands of No. 1 iron were quoted as follows: Gartsherrie, 49s. 6d.; Coltness, 50s. 6d.; Summerlee, 47s. 6d.; Langloan, 52s.; Glengarnock, 47s.; and Eglinton, 43s. 6d. Middlesbrough iron, f. o. b. Tees, was quoted as follows: No. 1 Foundry, 38s. 9d.; No. 2, 36s. 9d.; No. 3, 35s 3d.; No. 4, 34s. 9d.; and No. 4 forge, 34s. 9d. Bessemer iron was quoted as follows, f. o. b. Barrow: No. 1, 65s.; No. 2, 62s. 6d.; No. 3, 60s.

Rails.—We note sales, for New York shipment, of about 10,000 tons of steel rails. There is still a very good inquiry, with indications that the production for 1879 will be larger than during any previous year. We quote steel rails at mills at $41 and iron at $32@$36.

Old Rails.—Without business, we quote at $18.50@$19.50.

Wrought Scrap is firm but quiet, at $22.

Baltimore. Dec. 23, 1878.

[Specially reported by Messrs. R. C. Hoffman & Co.]

Transactions in iron for the past week have been light, as is usual for this season of the year, Prices remain unchanged. We quote:

Balt. Char	$26.00@$28.00	M. & White	$13.00@$14.00
Va. "	26.00@ 28.00	C'lC.B.Blooms	50.00@ 52.00
Anth.No.1	19.00@ 20.00	" " Billetts	52.00@ 55.00
" " 2	18.00@ 19.00	Refi'd Blooms	43.00@ 45.00
" " 3	16.00@ 17.00		

Cincinnati. Dec. 24, 1878.

[Specially reported by Messrs. Traber & Aubery, Commission Merchants for the sale of pig iron, blooms, ore, etc.]

Below please find closing quotations of our pig-iron market, viz.:

CHARCOAL.

H'n'g Rock	No. 1 Foundry & B 1	$21.00@$21.50	—4 mos.
"	No. 2 "	20.00@ 21.00	—4 mos.
"	Soft Silver Gray	18.00@ 19.00	—4 mos.
"	Mill	18.00@ 19.00	—4 mos.
Tennessee	No. 1 Foundry	20.00@	—4 mos.
"	No. 2 "	19.00@	—4 mos.
"	Mill	18.00@	—4 mos.

STONE COAL.

Ohio	No. 1 Foundry	$16.00@ 16.50	—4 mos.
"	No. 2 "	15.00@	—4 mos.
"	No. 3 "	14.00@	—4 mos.
"	No. 4 "	13.00@	—4 mos.
"	Mill	16.00@	—4 mos.

COKE.

Ohio & W. Va.	No. 1 Foundry	18.00@ 19.00	—4 mos.
" "	No. 2 "	17.00@ 18.00	—4 mos.
" "	Stove	16.00@	—4 mos.
" "	Mill	17.00@	—4 mos.

CAR-WHEEL

H'n'g R., C. B.	Hecla, Vesuvius, Etna, Buckhorn, Jefferson.	$30.00@ 35.00	—4 mos.
Maryland,	"Cedar Point	35.00@	—4 mos
Missouri,	"Maramec	28.00@	—4 mos

BLOOMS.

Charcoal.....$45.00@$50.00- cash

SCRAP IRON.

Cast	40c. @	45c.—cash
Wrought	62½c.@	$1.00—cash

Cleveland. Dec. 24, 1878.

[Specially reported by Messrs. C. E. Bingham & Co.]

No. 1 Red Specular	$6.00	per ton	cash.
No. 2 " "	5.00	"	"
Red Hematite	4.25	"	"
Lake Champlain ore	5.25	"	"

FOUNDRY IRON.

No. 1 L. S. Charcoal	$22 00	Am. S., No. 1, Ch. Val.	$20.00
No. 2 " "	21 00	" " B—1, " "	18.00
No. 1 Anthracite	20 00	" " No. 2 " "	18.00
No. 2 "	19 00	No. 1, Massillon	19.00
No. 1 Bituminous	20 00	B—1, "	17.00
No. 2 "	18 00	No. 2, "	16.00

CAR-WHEEL AND MALLEABLE IRON.

No. 3, L. S. Charcoal	$23 00	Nos. 5 & 6, L. S. Char.	$23 00
No 4, " "	23 00		

BESSEMER IRON.

Nos. 1 & 2, L. S. Char.....$23.00

FORGE IRON.

No. 1, Gray	$18 00	White and Mottled	$16 00

Columbus, O. Dec. 24, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, Dealers in Pig Iron and Ores.]

The demand for pig-iron since the date of our last report has been moderate, as is usually the case this season of the year. Consumers, as a rule, desire to have light stocks on hand at the time of closing up their year's business. Most sales of round lots are for future delivery, and in these prices are well maintained. We quote as follows:

FOUNDRY IRONS

No. 1 Hanging Rock Charcoal	$22.00@$22.50
No. 2 " " "	21.00@ 21.50
No. 1 Hocking Valley soft and strong from pure limestone ores	18.25@ 18.75
No. 2 Hocking Valley soft and strong from pure limestone ores	17.25@ 17.75
No. 1 American Scotch	18.00@ 18.50
No. 1 Moxahala	18.00@ 18.50
No. 2 "	17.00@ 17.50
No. 1 Shawnee	18.00@ 18.50
No. 1 Silver Gray	16.50@ 17.00
No. 2 " "	15.50@ 16.50

MILL IRONS.

Gray neutral	16.00@ 16.50
Mottled and white neutral	15.00@ 15.50
Gray cold short	15.50@ 16.00
Mottled and white cold short	14.50@ 15.00

Louisville. Dec. 24, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

The demand continues good, although this is usually a dull month. Prices are firm and unchanged.

The usual time, four months, is allowed on quotations below:

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal	$21 00@$22.00	$19.00@$20.00
Southern Charcoal	18.00@ 18.50	16.50@ 17.00
H'n'g Rock, Stc'l & Coke	19.00@ 20.00	18.00@ 18.50
Southern Stonecoal & Coke	18.50@ 19.00	17.00@ 17.50

"Amer. Scotch"... $18@$19 | Silver Gray... $16@$17.00

MILL IRONS.

No. 1 Charcoal, Cold-short & Neutral	$16.50@$17.00
No. 1 Stc'l & Coke, Cold-short & Neutral	16.50@ 17.00
No. 2 Stc'l & Coke, Cold-short & Neutral	15.50@ 16.00
No. 1 Missouri and Indiana, Red-short	20.00@ 21.00
White & Mottled, Cold-short & Neutral	14.50@ 15.00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold Blast	$29.00@$33.00
Alabama and Georgia, Cold Blast	28.00@ 29.00
Kentucky, Cold Blast	25.00@ 30.00

Philadelphia. Dec. 27, 1878.

[Specially reported by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia.]

Pig Iron.—There is little doing in the way of business this week. Consumers are repairing their works and producers looking over the assets for the year. We hear of considerable inquiry, but no large sales are reported. We quote No. 1, $17@$19; No. 2, $15.50@$18; Grey Forge, $15@$17, all Philadelphia.

Manufactured Iron.—Most mills are shut down for stock-taking and repairs this week; hence, little business to report. Bars are firm at quoted prices, with a good outlook for the new year. In plates some mills have all they can do, and in one or two cases orders have been refused, while other mills are doing little or nothing. This can not last; either all will be dull or all have something to do as the new year comes in, and all expect brisk times for some time to come, as prices on plates are lower than any other class of iron with the exception of pig, so better prices can be looked for. In skelp, little new to report. One or two mills are doing all the business at prices the others do not envy them. We quote: Bars, 1 7-10@2c. per lb.; Plate and Tank, 2⅛@6c. per lb.; Skelp, 1 9-10@2c per lb.

Rails.—The steel-rail market is reported a little weaker than last week's quoted prices; and this is hardly to be wondered at, as steel rails on the other side are selling at about $25. We quote all mills busy at $40@$44 at mill. Iron Rails: The mills continue to do some business. We quote $32@$36 at mill.

Old Rails.—Nothing new to report. We quote $18.50@$19.50.

Scrap.—Wrought is quoted at $19@$21; Cast, $12@$16.

Pittsburg. Dec. 24, 1878.

[Specially reported by A. H. CHILDS.]

	4 mos.		4 mos.
No. 1 F'dry	$19.00@$20.00	M. & White	$15.00@$16.00
No. 2 "	18.00@ 19.00	Hot Blast Ch.	20.00@ 23.00
Gray Forge	16.50@ 19.00	Cold Blast W.	35.00@ 37.00

Richmond, Va. Dec. 23, 1878.

[Specially reported by ASA SNYDER, Esq.]

The season's business is over, except deliveries on previous orders. The market closes firmly.

Amer. Scotch Pig Iron	$21.50@$22.50
Anthracite " " No. 1	19.00@ 20.00
" " " No. 2	18.50@ 19.00
" " " No. 3	17.00@ 18.00
" " Mottled	15.00@ 16.00
Coke " No. 1	19.00@ 20.00
" " No. 2	18.00@ 19.00
Va. Cold Blast Charcoal Pig Iron, cold short	19.00@ 22.00
" " " " " neutral	27.00@ 28.00
" Warm " " " " cold short	18.00@ 20.00
" " " " " mill	17 00@ 18 00
Old Rails	17.00@ 18.00
Wrought scrap No. 1	16.00@ 17.00
Cast scrap—Machinery	15.00@ 16.00
Richmond Refined Bar Iron	2.00@ 2.10
Horse-shoes	4.00@ .....
Mule-shoes	5.00@ .....
Old Dominion nails (standard size)	2.25 keg.

Freight by sail to New York, $1.60 for 2240 lbs.

St. Louis. Dec. 24. 1878.

[Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.]

The iron interest looks much brighter. We anticipate a good trade after the 1st of January. Old rails are in fair demand and very scarce. Prices remain the same.

COLD BLAST CHARCOAL—ALL NUMBERS.

Hanging Rock	$23@$25	Assorted Bar Iron	$1.95 rates.	
Tennessee	22@ 23	No. 1 Wr'ght Scrap,	90c. cwt.	
Kentucky	22@ 23	Heavy cast "	65c. "	
Missouri	22@ 23	Light " "	40c. "	
Georgia	22@ 23	Old rails	$19.00@$21.00	
Alabama	22@ 23	Old carwheels	17.00@ 18.00	

	No. 1.	No. 2.	Mill.	White and Mottl'd
Missouri stone coal	$21.00	$20.00	$19.00	$17.00
" charcoal	20.00	19.00	18.00	.....
Tennessee charcoal	20.00	18.50	17.50	.....
Tenn. coke very soft and strong	20.00	19.00	17.00	16.00
Hanging Rock charcoal	22.00	20.00	19.00	.....
" " cold short	23.00	21.00	20.00	.....
	ExNo.1	No. 1.	BNo.1.	No. 2.
Alice Hanging Rock coke	$22.00	$21.00	$19.50	$19.00
Moxahala Black Band ores	21.00	20.00	19.50	18.00

METALS

NEW YORK, Friday Evening, Dec. 27, 1878.

As is usual at the holiday times, there is so little demand as to make prices quite nominal.

Gold Coin.—During the week under review the price of gold has ranged from 100 to 100⅛, and closed at 100.

Copper.—We learn of no business in this article, which is held at 16c. There are no changes in the London market advised by cable.

From London, under date of December 13th, we have received the following:

"The market is in a very unsettled state; a few parcels of Chili bars are offering, from second hands, at rather low figures, and we note business in about 75 tons of these, at £57¼ and £57⅛, according to brand and prompt. There are still orders in the market for certain favorite brands at the higher price, but holders have hitherto refused to entertain the bids, and stand out for an advance thereon of 10s. per ton. We call values as follows: G. O. B.s, £57@£57¼; favorite marks, £57⅛@£58, and best sorts £58@£58⅛, with a good inquiry at the lower rates; moderate quantities obtainable at the higher quotations. Wallaroo cake may be called £68; Burra, £65½, sellers."

Tin.—In the absence of business, prices are quite nominal. Straits is held at 15c.; L. & F. at 14½@14⅝c.; and Refined, 15c. To-day's cable advices quote Straits in London at £61, and in Singapore, $18.75.

From London, bearing date of December 13th, we are advised as follows:

"Tin maintains the late advance; the transactions of the day amount to about 50 tons, part cash, part forward delivery, at 62s., and which is now the current value for metal in either position."

Tin Plates.—With the exception of more firmness in coke tins, there is no change from our last. In these we note sales of 2000 boxes, at $4.95@$5. We quote as follows: Charcoal, bright, ⅛ X, Melyn grade, $5.87½@$6, and Allaway grade, $5.75@5.87½; charcoal ternes, Allaway grade, $5.25@$5.37½; coke bright, B. V. grade, $5@$5.12½, and roofing, 14×20, $4.70.

Messrs. Robert Crooks & Co., of Liverpool, under date of December 12th, say of tin plates:

"Reports of large offers for coke tins at within a shade of the advance asked are not confirmed by our own observation, which would go to show that for the present buyers are supplied. If they can keep out of the market till running contracts are completed, there will be a drop, but all hinges on their ability to do this. Ternes and charcoal tins are in light demand, at almost lowest prices reached."

Lead.—Sales, in a small way, aggregating about 200 tons, at 4c., are reported. This is the closing price. The situation is still unchanged, the Eureka Company still stocking its product, with every indication that it will continue to hold for some time to come.

The San Francisco *Commercial Herald* of December 19th says: "The ship Ocean King, for New York, carried 19,700 pigs of lead, weighing 2,001,526 lbs."

Spelter and Zinc.—Spelter has been very quiet, and is quoted nominally at 4½c. Sheet zinc has been quite active, the sales including 250 casks at 5¼@5⅝c., since when the price has advanced to 6¼@6⅜c. The cause for this sudden advance has been the purchase of the La Salle works by the Matthiessen & Hegeler Zinc Co., which now monopolizes the whole sheet-zinc manufacturing business in this country.

Antimony is quiet and weak, being quoted at 11¾c. for all kinds.

THE BULLION MARKET.

NEW YORK, Friday Evening, Dec. 27, 1878.

The silver market has continued quite stationary in London and here the past week, but closes weak. There have been no shipments to the East Indies during the past fortnight, and but for some demand for Austria and the Orient, with limited supplies, the market would have gone lower. Germany has been waiting for a direct continental demand rather than sell through the English market, which has also served to prevent lower figures. The market is without promise of improvement at present. The closing prices were: In London, 49 9/16d.; in New York, $1.08½; in San Francisco, 16 per cent discount.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents.
Dec. 21	49½	108¼	Dec. 25.	.....	.....
Dec. 23	49⅝	108½	Dec. 26.	49 9-16	108⅛
Dec. 24	49⅝	108½	Dec. 27.	49 9-16	108½

BULLION SHIPMENTS.

We give below a statement showing the latest bullion shipments in addition to those announced in our issue of December 21st:

December 13	Leopard	Nev.	$5,000.00
" 15	Hillside	"	5,119.00
" 14	California	"	194,503.72
" 14	Northern Belle	"	7,819.00
" 16	Navajo	"	5,200.00
" 16	Grand Prize	"	28,000.00
" 13	Bodie	Cal.	11,920.00
"	Gillett	Ariz.	22,435.00
" 19	Silver Reef	Utah	6,877.50
" 17	Ely Mill	"	1,200.00
" 20	Ontario	"	82,000.00

The Centennial Mine (G. V.) recently crushed 143 car loads of quartz with a profit of about $9000, or nearly $63 per car load.

Salt Lake Ore and Metal Market.

Ore Shipments from San Francisco.—The ship Ocean King, for New York, recently carried 480 tons of assorted ore, 492 sks. do., also of lead 19,700 pigs, say in all 20,856 lbs. copper ore, 973,200 lbs. chrome ore, 20,600 lbs. lead ore.

The Matamoras furnace of Eureka, Nev., shipped on the 12th inst., 20 tons of bullion to Pittsburg. It was half gold, and averaged about $700 per ton.

The Farwell reduction works at Georgetown are now run by water-power, which is taken from Clear Creek, at Devil's Gate, through about 1400 feet of iron pipe. The mill shipped four 90-pound bricks last week for five working days, averaging about $1200 to $1400 per brick.

C. C. Bean, owner of the Bradshaw quartz mill, Arizona, has contracted with Philip Richardson to crush 300 tons of Gray Eagle ore at $25 per ton.

Gilpin County (Colorado) Bullion Shipments for November.—"The bullion shipment from Gilpin County by the Union Pacific Express Company, for the month of November, was as follows: From Hill's smelting works, gold, $90,000; from the mills, gold, $105,700, and silver, $103,800."

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, Dec. 27, 1878.

Although the business of the week was confined to five days, and quietness was the order of things at the New York Stock Exchange, yet the coal stocks received a liberal amount of attention. Prices at the close show a marked decline, owing to the formal announcement that the combination is "busted." Delaware and Hudson Canal has been quiet, the sales amounting to but 3993 shares, within the range of 37@37⅛, closing at 37⅛; Delaware, Lackawanna,

COAL STOCKS.

NAME OF COMPANY.	Capital Stock.	SHARES. No.	Par Val.	Last Dividend.	Rate per Ann.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted, so much per share. Dec. 21. H.	L.	Dec. 23. H.	L.	Dec. 24. H.	L.	Dec. 25. H.	L.	Dec. 26. H.	L.	Dec. 27. H.	L.	SALES
	$		$	Mo. Y. A't.	Per c'nt													
Consol. Coal.	10,250,000	102,500	100	Jan. 77 2⅛	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Del. & H. C.	20,000,000	200,000	100	Aug 76 4	9	37⅛	37	37⅛	37	37⅛	37⅛	.....	.....	37⅜	37	37⅛	37	3,993
D., L. & W. RR	26,200,000	524,000	50	July 76 2½	5	43¾	42⅞	43½	42¾	43⅛	42⅞	.....	.....	43⅜	41¾	43⅜	41¼	103,310
Lehigh C. & N	10,448,550	208,971	50	Nov 76 1½	5½	15	14¾	14¾	14¾	14⅞	14⅝	.....	...	14⅞	14⅝	14⅝	14½	1,619
Leh. V'y R. R	27,228,855	540,858	50	Dec 78 1	4	.....	.....	.....	.....	34¼	34⅛	.....	...	34	33¾	33⅜	33	807
Maryl'd Coal	4,400,000	44,000	100	Jan. 76 1½	1½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
N. J. C. R. R.	20,600,000	206,000	100	Apr 76 2½	2½	33⅞	32⅜	34¾	33⅝	34¼	33½	.....	.....	33¾	31⅝	32⅛	31⅝	34,339
Penn. Coal	5,000,000	100,000	50	May 78 3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Penn. R. R.	68,870,200	1,337,404	50	Nov 78 2	8	32⅜	32¼	32⅜	32¼	32⅜	32⅛	.....	.....	32⅝	32¼	32¼	32⅛	26,582
Ph. & R. R. R	34,278,175	685,563	50	Jan 76 4½	10	13¼	12⅝	13⅛	12¾	13¼	12¾	.....	.....	12¾	12	11⅝	11⅜	7,536

The Delaware and Hudson Canal Co. has paid in dividends to date $38,821,104, and the Philadelphia and Reading $43,012,497.

Total Sales..... 178,186.

and Western records sales of 103,310 shares, at 43¾ @41¼, closing at 41⅝; New Jersey Central has had liberal dealings, advancing to $34¾ on prospects of becoming a trunk line, but declining to 31⅝ on prospects of low prices for coal in 1879, recovering, however, at the close to 31½.

The Fanchance Iron Co. will hold its annual meeting January 8th, 1879.

Volcanic Coal and Oil Co.—1500 shares of this stock sold at auction during the week at $2@$1.90 per share.

Angell and Blake Manufacturing Company.—The annual election of the trustees will be held January 9th, 1879.

Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore, for the week ending the 27th inst. are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

Stocks.	Par Value.	High'st	Lowest	Closing	Sales: Shares.
American Coal Co.	$25	. . ..	.....	30	.....
St.L.,I.M.& S.R.Co..	100	.....	.....	13	84
Spring Mt. Coal Co.	50	.....	.....	50	.....
*Cambria Iron Co..	50	.....	.....	59	.....
*Penn.Salt Mf'g Co.	50	....	.....	67	....
*Westm'land C. Co.	50	.....	.....	45½	.....
*Buck Mt. Coal Co..	50	.....	.....	38	.....
*Schuyl. Nav. Co...	50	.....	.....	.....	.....
†B.&O.RR.Co.1st pf	.....	.....	.....	99	35
†B.&O.RR.Co.2d pf	100	.....	.....	95	80
" " " com	90	88⅜	88¼	88	7
†George's C'k C. Co	100	.....	.....	86½	.....
†S. Clara M'g Co...	100	.....	.....	25	.....
†Atlantic Coal Co.	10	.....	.....	75	.....

Bonds.	Princ'l. When Due.	Int'est. When Due.	Hig'st.	Lowest	Amount.
D., L. & W., 7s, conv	1892	J. & D.	.....	105⅛	.....
" " " " 2d mtge.	1881	M. & S.	.....	.....	.....
N.J.C.,1stmtge.new	1890	F. & A.	115¾	.....	1,000
" " " 1st mtge.,con	1899	Q.	73	71½	*286,000
" " " convt.....	1902	M. & N.	72½	71¾	*34,000
Lehigh & W. B., con	1890	Q.	50	..	†12,000
Am. Dock & Imp. 7s	.....	J. & J.	50¼	50	*10,000
St.L.I.M.& S..1st mt	1892	F. & A.	.....	108	....
Ches. & O., 1st mtge	1899	M. & N.	.....	30	.....
D & H C Co.,1stm.rg	1884	J. & J.	.....	95	.....
" " " " " " "	1891	J. & J.	.....	96	....
" " " " m.loan cp	1894	A. & O.	94¾	.....	3,000
" " " " " " rg.	1894	A. & O.	.....	93	....
" " " " " new mge.	.....	.....	.....	.....	....
*L.V.R., 1stm.6s.cp.	1898	J. & D.	110⅛	.....	1,000
" " " " rg.	1898	J. & D.	111	.....	9,000
" " " 2d m. 7s,rg.	1910	M. & S.	116	.....	3,000
" " " con.m.6s,rg	1823	J. & D.	97½	.....	3,000
" " " " 6s cp.	1923	J. & D.	....	.....	.....
*Pa.RR.,1st m.6s,cp	1880	J. & J.	105¼	.....	50,000
" " g. m., 6s, cp.	1910	J. & J.	.....	110	.....
" " " 6s, rg.	1910	A. & O.	110⅛	.....	1,000
" " con.m.6s,rg.	1905	Q.	100	.....	1,000
" " " 6s, cp.	1905	J. & D.	99⅛	.....	40,000
" " new loan, 5s	.....	.....	111	.....	4,600
*P.& R. R., 1st m.6s, R. C. 43-44.....	1880	J. & J.	.....	.....	.....
P. & R. R., 1st m. 6s, R. C. 48-49.....	1880	J. & J	.....	.....	.....
P.& R. R.,2d m.7s cp	1893	A. & O.	.....	.....	.....
" " " scrip....	1882	J. & J.	.....	50	.....
" " " in.m.7s,cp	1896	J. & D.	.....	.....	.....
" " " c.m.7s,cp.	1911	J. & D.	98	.....	6,000
" " " " 7s. rg.	1911	J. & D.	98	97¾	12,000
" " " cvt.7s,R.C	1893	J. & J.	....	45	.....
" " C.& I.Co.,Deb 7s, R. C.....	1892	M. & S.	.....	.....	.....
& R.C.& I. Co., m. 7s, R. C.....	'92-3	various	.....	.....	.....
L. Nav. Co.,6s,rg.m.	1884	J. & Q.	102½	.....	3,200
" " RR., rg. m.	1897	F. & Q.	105	.....	2,000
" " cvt. co. G. R.	1894	M. & S.	.....	.....	.....
" " " Gold R. C.	1897	J. & D.	91	.....	10,000
" " con.m.7s,rg.	1911	J. & D.	.....	.....	.....
*P.& N.Y.C.,7s,R.C.	1896 / 1906	J. & D.	....	113	.....
*Pa Canal, 6s. cp..	1910	J. & J.	....	65	.....
*Schuyl.Nav.,1st m. 6s. rg.....	1897	M. & Q.	.....	80	.....
*Sus. Coal, 6s, rg...	1911	J. & J.	....	87	5,000
†Balt.&O. RR., 6s..	1880	J. & J.	.....	103	.....
" " " " 6s..	1885	A. & O.	105½	.....	8,000

Total transactions for the week.....$504,800

* Assented. † 15,000 assented, selling at 36⅜.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, Dec. 27, 1878.

The business of the past week has been quiet, owing to the observance of Christmas. The coal stocks all show a decline, because the dissolution of the combination is now an announced fact. The dealings have been as follows: Lehigh Coal and Navigation, 1619, shares, at $15@$14½; Lehigh Valley Railroad, 807, at $34¼@33; Pennsylvania Railroad, 26,582, at $32⅝@32½, and Philadelphia and Reading, 7536, at $12⅝@$11¾.

The following companies have their dividend periods during the month of January, 1879:

Elmira and Williamsport R.R. Co., on preferred stock.
East Pennsylvania R.R. Co.
East Mahanoy R.R. Co.
Mill Creek and Minehill R.R. Co.
Mount Carbon and Port Carbon R.R. Co.
Lehigh Valley R.R. Co.
Harrisburg, Portsmouth, Mount Joy, and Lancaster R.R. Co.
Little Schuylkill R.R. Co.
Minehill R.R. Co.
North Pennsylvania R.R. Co.
Schuylkill Valley Navigation and R.R. Co.
United Cos. of New Jersey.
Schuylkill Navigation Co., on preferred stock.
Buck Mountain Coal Co.
Fulton Coal Co.
Nescopec Coal Co.
Diamond Coal Co.
Locust Gap Improvement Co.

Coupons and Interest on the bonds of the following companies will fall due during the month of January, 1879:

Susquehanna Coal Co.—6 per cent bonds; coupons.
West Jersey Marl and Transportation Co.—Coupons.
Union and Titusville R.R. Co.—7s; coupons.
Allegheny Valley.—7.30s of 1896; coupons.
Elmira and Williamsport R.R.—1st mortgage coupons.
Ithaca and Athens R.R.—1st mortgage gold 7s; coupons.
Northern Central R.R.—2d mortgage 6 and cons., mtge., gold 6s of 1900; coupons.
North Pennsylvania R.R.—1st mortgage 6s and gen. mtge 7s; coupons.
Pennsylvania R.R.—1st mtge 6s, gen. mtge. 6s, and Navy Yard 6s; coupons.
Reading R.R.—6s, new conv. 7s, debentures, and scrip: coupons.
Reading C. and I. Co.—1st mortgage 7s and scrip; coupons.
Shamokin Valley and Pottsville R.R.—7s; coupons.
Western Pennsylvania R.R.—6s; coupons.
Chesapeake and Delaware Canal.—Coupons.
Delaware Division Canal.—6s; coupons.
Lehigh Navigation.—6s; coupons.
Pennsylvania Canal Co.—6s; coupons.
Schuylkill Navigation.—2d mortgage 6s conv., mort. 6s, and scrip.
Susquehanna Canal.—6s and 7s of 1902 and scrip; coupons.
Saltsburg Coal Co.—1st mortgage loan; coupons.

Gas Stocks.

NEW YORK, Friday Evening, Dec. 27, 1878.

We note a little stronger market than a week ago, from the fact that holders are inclined to advance. Bid quotations remain about the same, the most noticeable exceptions being Mutual, from 55 bid to 50, and Williamsburg from 75 bid to 70; Jersey City, from 120 bid to 125, and Metropolitan from 97 bid to 95.

San Francisco Gas Co.—This stock is selling at reduced rates. It is anticipated that this company will be compelled to reduce the monthly dividends on account of the recent reduction in the price of gas.

The Denver (Colo.) Gas Appropriations for 1879.—The Mayor of Denver recently submitted his estimates for gas for public purposes for 1879, as follows:

229 lamps at $40	$9,160
Extra lamps and gas	600
Gas City Hall	200
Total	$9,960

The Northern Liberties Gas Co., Philadelphia, will have its dividend period during the coming month.

Metropolitan Gas-Light Co.—The annual meeting of the stockholders of this company, for the election of directors, will be held January 13th, 1879.

The following list of Companies in New York and vicinity is corrected weekly by George H. Prentiss, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

Companies in New York and Vicinity.	Capital Stock.	Par.	Dividends. Rate per ann.	Dividends. Am. of last.	Dividends. Date of last.	Quotations. Bid.	Quotations. As'd.
	$		P. ct.				
Mutual, N. Y....	5,000,000	$100	6	1½	Oct., '78	50	60
" Bonds...	90,000	1,000	6	3½	Aug., '78	90	96
N. York "	4,000,000	.....	8	4	May, '78	78	80
Metrop. "	2,500,000	100	10	5	Aug., '78	95	102
" Certfs...	1,000,000	.....	7	3½	" '78	90	92
Harlem "	1,850,000	50	6	3	Feb., '78	26	35
Manhat. "	4,000,000	50	.....‡	5	May '78	145	150
Brooklyn, Bkln.	2,000,000	50	15	5	Apr., '78	118	122
Nassau	1,000,000	25	.....‡	3	July, '78	50	55
" Certfs....	700,000	1,000	7	3½	May, '78	80	85
People's.....	1,000,000	10	....‡	3½	Jan., '76	18	20
" Certfs....	300,000	1,000	7	3½	July, '78	70	75
" Bonds....	325,000	.....	7	3½	May, '78	90	96⅛
Metrop. "	1,000,000	100	5	2½	May, '78	50	60
W'msb'g "	1,000,000	50	8	1½	July, '78	70	80
" Certfs...	1,000,000	.....	7	3½	July, '78	85	90
Citizens'.....	1,200,000	20	....‡	3	July, '78	53	60
" Certfs...	320,000	1,000	7	3½	Apr '78	90	95
J. C., N. J.....	750,000	20	10	7½	July, '78	125	135
Municipal, N.Y.	466,000	50	.....	.....	.....	80	90
" Bonds..	750,000	....	.....	.....	.....	.....	...
.....	.....	.....	.....	.....	.....	.....	...

Copper Stocks.

Reported by Wilson W. Fay & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Thursday Evening, Dec. 26, 1878.

The market has been quiet during the week, not only on the mining stocks, but on the whole list, the activity and bustle of the approach of the holidays having its usual effect, and drawing the attention of investors from stocks to the annual selection of suitable gifts. The market, however, has not been entirely neglected, as some of the stocks have been quite active in comparison to their usual quiet state. There is every appearance of a general rise in copper stocks before a great while, as there is undoubtedly going to be more money in circulation in this vicinity the next year than there has been for some time, and a disposition is already shown to buy some of the stocks that are selling too low, as can be seen by the recent rise in Quincy and Osceola, the activity in Ridge and the general tone of strength to the market.

Calumet and Hecla has declined to 173¼ bid and 174 asked, and sales at 174.

Central is quiet, at 25@29.

Copper Falls is also quiet, at 1@1⅛.

Franklin, after having declined somewhat, has strengthened again to 4 bid and 5 asked.

Osceola has also advanced to 11 bid and 12 asked.

Pewabic is quiet, at 1@1⅛.

Quincy is being sold in large lots up to 14¾, but closes a little weaker, at 14¼@14½, some of the large sales quoted being evidently "washes."

Ridge is quite active, having sold up to 1⅝, and closes firm at 1⅝@1¼.

Duncan has reacted and sold up to 4, but closes a little weaker, at 3⅝@3¾.

International is quiet, at 37½@40.

Silver Islet has advanced to 44, and closes rather firm, at 43¾@44.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Dec. 27, 1878.

The business at the Mining Exchange has been very small, while the transactions show but little worthy of note.

The San Francisco stocks continue to attract a great deal of attention. We note the following sales: Bodie, 20 shares, at $9; California, 530, at $9⅛@$10¼; Consolidated Virginia, 885, at $7½@$8¼; Eureka Consolidated, 10, at $33½; Gould and Curry, 200, at $8⅛@$9⅛; Independence, 1420, at $1.35@$1.10; Sierra Nevada, 20, at $47; Yellow Jacket, 150, at $15@$14¾; Julia, 300, at $3.15@$3; Justice, 65, at $4.25@$4.12½; Leviathan, 225, at 50@40c.; Mexican, 70, at $30@$31½; Navajo, 200, at 50c.; Tip Top, 100, at $1¼; Lady Washington, 200, at $1½.

Among the more important list of mines represented in this market only, Hukill has attracted most attention, declining from $3.60@$3.30. This is not caused by any sudden change in the prospects at the mine, but is the result of forcing upon the market more stock than it would take at the old figures. The sales for the week aggregate 1565 shares, at $3.60@$3.30. Findley has only been dealt in to the extent of 200 shares, at 63@62c. Moose has been rather quiet, the sales amounting to but 775 shares, at $4.60@$4.40. New York and Colorado records 100 shares sold, at $1.45. In Ontario there has been a business of but 15 shares, at $39¼. Plumas has sold to the extent of 300 shares, at $3.65@$3.40.

Among the fancies, Gol.. Placer has been the leading card, the sales having amounted to 45,500 shares, at 22@18c. American Flag has been dealt in to the extent of 1200 shares, at 19@21c. The other transactions have been as follows: Bertha and Edith, 25,400 shares, at 10@7@9c.; Buckeye, 2200, at 50@51c.; Dahlonega, 11,700, at 18@15c.; Lacrosse, 17,800, at 31@28c.; Trio, 300, at 45c.

Review of the San Francisco Market.

The past week has witnessed a steady and a very quiet market in the Pacific Coast stocks. The interest in mines, as investments, is growing very rapidly, and the attention of capitalists and operators in mining shares is gradually being given to mines outside of the Comstock, from which capital is slowly but surely being diverted.

There is remarkable activity in the Bodie district, and large sums are being expended there for mining machinery and developments. The new deposits discovered in Paradise Valley, in Humboldt County, Nev., are also attracting attention and capital. The Tuscorora district, the Meadow Lake district, and a number of other districts in Nevada; the wonderful deposits of Arizona, which are just proving to the world the existence of fabulous mineral wealth; the Black Hills region, Colorado, Utah, Idaho, etc., will receive greater attention and more systematic development the ensuing year than ever before, all of which will undoubtedly have the tendency to draw away capital from mines which have, time and again, deceived their supporters, to those which promise at least a safer return.

Alpha shows some improvement on the last quotation. The joint Imperial winze is now down 164 feet on the slope below the 2400 level, the bottom in porphyry streaked with quartz. Alta is steady, with very satisfactory progress being made in the mine.

Belcher is steady; the bottom of the main incline in this mine is in hard blasting rock. The face in crosscut No. 3, on the 2360 level is in a good quality of quartz.

Best and Belcher is also steady. A strong flow of water has been struck in the bottom of the Osbiston shaft which materially interferes with the sinking.

There is no change in Bullion, either in the price of the stock or appearance of the mine; the usual progress is being made, and the face of the east drift on the 2050 level is reported in favorable matter.

We have no quotation of Benton. The stock is selling in San Francisco, at from $2.75 to $4.10 per share. This company has reduced its working force to eight men, with which force it anticipates mining 15 tons per day, sufficient to keep the Union Mill steadily running, anticipating to begin crushing by the 1st of January.

Bulwer is quoted in San Francisco at from $15 to $16 per share. The ledge in the south drift in this

GENERAL MINING STOCKS.

Dividend Paying Mines.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	Par Val	ASSESSMENTS. Total levied to date.	Date and amount per share of last.		DIVIDENDS. Total paid to date.	Last Dividend.			Rate p. An	HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. Dec. 21. H.	L.	Dec. 23. H.	L.	Dec. 24. H.	L.	Dec. 25. H.	L.	Dec. 26. H.	L.	Dec. 27. H.	L.	SALES.
Alps	Nev.	800		30,000		204,000	Aug. 1878	$1 00	37,500	Apr. 1876	$0	05														
Belcher, G. S.	Nev.	1,040	10,400,000	104,000	100	1,392,200	Oct.. 1878	1 00	15,397,200	Apr. 1876	1	00														
Bobtail, G.	Col.	2,500	1,136,630	227,326	5	*			56,831	Nov. 1877		25														
Bobtail Tunnel, G.	Col.		100,000	20,000	5	52,000	July 1873	0 30	48,000	June 1878		50														
Bodie, G.	Cal.		5,000,000	50,000	100	25,000	Feb. 1878	0 50	750,000	Dec. 1878	1	00													9		20
California, G. S.	Nev.	600	54,000,000	540,000	100				29,700,000	Dec. 1878	1	00		10	9½	9⅝		10				9½		10¼		530
Calumet & Hecla, C.	Mch		2,000,000	80,000	25	1,200,000			13,450,000	Aug. 1878	5	00														
Central, C.	Mch		500,000	20,000	25	100,000	June 1862	0 65	1,260,000	Feb. 1877	5	00														
Chollar Potosi, G. S.	Nev.	1,400	2,800,000	28,000	100	1,750,000	Sept. 1878	5 00	3,080,000	Feb. 1872	1	00														
Copper Falls, C.	Mch		1,000,000	20,000	50	535,000	May. 1876		100,000	Nov. 1871	1	00														
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	474,600	June 1873	3 00	40,500,000	June 1878	1	00		8¼	7½	8¼	7¾	8¼	8			8¼	8⅛	8		885
Confidence, G. S.	Nev.	130	2,496,000	24,960	100	256,320	Apr. 1878	0 50	78,000	May. 1865	8	½														
Cons. Her. & Roe	Col.	16,500	1,000,000	100,000	10	*																				
Crown Point, G. S.	Nev.	600	10,000,000	100,000	100	1,873,370	Sept. 1878	1 00	11,588,000	Jan.. 1875	2	00														
Daney	Nev.	2,000		108,000		91,800	Nov. 1878	0 20	56,000	July 1863																
Eureka Cons., G. S. L.	Nev.		5,000,000	50,000	100	100,000	May. 1876	1 00	3,250,000	Nov. 1878	3	00						33½								10
Eureka G. Mg., G.	Cal.	1,680	2,000,000	20,000	100				2,140,000	Apr. 1878	0	25														
Findley, G	Geo.		200,000	200,000	1				20,000	Dec. 1878		10				63c						62c				200
Franklin, C.	Mch		500,000	20,000	25	300,000	June 1876	5 00	585,000	Nov. 1871	1	00														
Gila	Ariz			100,000		50,000	Aug. 1878	0 25	50,000	Aug. 1875	0	25														
Gould & Curry, G. S.	Nev.	612	10,800,000	108,000	100	2,828,000	Nov. 1878	1 50	3,826,800	Oct. 1870	10	00		87⅛				9½								200
Grand Prize	Nev.	1,500		100,000		100,000	July. 1878	1 00	400,000	Feb. 1878	1	00														
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	2,914,000	Aug 1878	1 00	1,598,000	Apr. 1871	5	00														
Hukill, G. S.	Col.	3,288	1,000,000	100,000	10	*				Dec. 1878	0	10		3.60	3.35	3.60	3½	3½	3.30			3.30		3.40	3.30	1,565
Independence	Nev.	1,500		100,000		75,000	Feb.. 1878	15	150,000	Nov. 1878		25		1.35	1.30	1.35		1.35				1¼	1.15	1.20	1.10	1,420
Kentuck, G. S.	Nev.	95	3,000,000	30,000	100	300,000	Aug. 1878	1 00	1,252,000	Mar. 1870	5	00														
K. K. Cons.	Nev.			50,000		250,000	Nov. 1878	1 00	50,000	Sept. 1873	0	25														
Leeds	Uth.	3,000		60,000					78,000	Oct.. 1878	0	15														
Leopard, L. G. S.	Nev.	1,500	5,000,000	50,000	100	175,000	Oct.. 1878	50	162,500	Dec. 1876	0	50														
Manhattan	Nev.			50,000		50,000	Oct.. 1878	1 00	400,000	Feb. 1877	1	00														
Merrimac, S.	Mas.	1,500	500,000	100,000	5	*	June		120,000	Mar.																
Minesota, C.	Mch.		1,000,000	20,000	50	436,000		1 00	1,820,000	Mar. 1876	0	50														
Modoc	Cal.	4,000		100,000		400,000	Nov. 1878	0 50	50,000	Dec. 1876	0	50														
Moose	Col.	39,000	2,000,000	200,000	10	*			550,000	Mar. 1878	0	25				4 45	4.40	4.60	4.45			4.40				775
National, C.	Mch.		500,000	20,000	25	195,000	Oct.. 1875	1 00	360,000	Oct. 1873	1	00														
N. Y. & Colorado, G.	Col.		1,000,000	50,000	20	*			20,000	Mar. 1877	0	20				1.45										100
Northern Belle, S.	Nev.	1,600	5,000,000	50,000	100				1,425,000	Feb. 1878	1	00														
Ontario	Uth.	3,000	10,000,000	100,000	100				1,900,000	Dec. 1878		50						39¼								15
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	3,436,800	Nov. 1878	1 00	1,394,400	Mar. 1864	4	00														
Pewabic, C.	Mch.		500,000	20,000	25	185,000	June 1868	3 00	460,000	July 1873	1	00														
Phœnix, C.	Mch.		1,000,000	20,000	50	817,500	Sept. 1870	3 00	10,000	Dec. 1876	1	00														
Plumas	Cal.		1,000,000	100,000	10				100,000	Dec. 1878		10				3.60						3.65		3.40		300
Quincy, C.	Mch.		200,000	20,000	10				2,230,000	Feb. 1878	5	00														
Raymond & Ely, G. S.	Nev.	5,000	3,000,000	30,000	100	630,000	Oct.. 1878	1 00	3,075,000	Sept. 1873	3	00														
Ridge, C.	Mch.		500,000	20,000	25	200,000			90,000	Feb. 1875	1	00														
Rye Patch	Nev.	1,600		30,000		127,500	Aug. 1878	1 00	105,000	Dec. 1877	0	25														
St. Joseph, L.	Mo.	2,000 acs.	1,000,000	100,000	10				250,000																	
Savage, G. S.	Nev.	800	11,200,000	112,000	100	3,972,500	Sept. 1878	1 00	4,460,000	June 1869	3	00														
Seaton, G. S.	Col.	1,700	500,000	50,000	10	*				May 1877	0	10														
Sierra Nevada, G. S.	Nev.	3,650	10,000,000	100,000	100	2,350,000	Oct.. 1878	3 00	102,000	Jan. 1871	1	00						47								20
Silver Islet	Mch																									
Silver King	Ariz								480,000	Nov 1878	0	50														
Standard	Cal.			50,000		50,000	July 1878	1 00	700,000	Nov. 1878	1	00														
Yellow Jacket, G. S.	Nev.	1,200	12,000,000	120,000	100	3,798,000	Sept. 1878	1 00	2,184,000	Aug. 1871	2	50						15	14¾							150
McClinton	Cal..	1,000		60,000																						

Non-Dividend Mines.

Allouez, C.	Mch.		1,000,000	20,000	50	940,000	May	1876	5 00																				
Alpha, G. S.	Nev.	300	3,000,000	30,000	100	240,000	Mar.	1878	1 00																				
Alta	Nev.	600		100,000		885,000	July	1878	1 00																				
Am. Flag, G.	Col.	5,300	900,000	60,000	10	*											20c		21c			19c		21c	20c	1,200
Andes	Nev.	2,000		100,000		355,000	Oct	1878	0 25																				
Baltimore Cons.	Nev.	1,050		84,000		1,015,000	Apr.	1878	0 50																				
Benton	Nev.	600		108,000		37,800	Aug.	1878	0 35																				
Bechtel	Cal.			60,000		75,000	Nov.	1878	0 25																				
Bertha & Edith, G.	Vir.	645 acs.	500,000	500,000	10	*								10c	9c	8c		8c	7c			9c	8c	9c	8c	25,400
Best & Belcher, G. S.	Nev.	545	10,080,000	100,800	100	438,590	Apr.	1878	1 00																				
Boyle	Nev.	600		108,000		16,240	Aug.	1878	0 15																				
Buckeye	Col.		2,000,000	400,000	5	*								51c	50c			51c								2,200
Bullion, G. S.	Nev.	943⅛	10,000,000	100,000	100	2,952,000	Aug.	1878	1 50																				
Caledonia, G. S.	Nev.	2,188	10,000,000	100,000	100	1,540,000	Nov.	1878	0 50																				
Cashier	Col.		500,000	250,000	2	*																							
Challenge	Nev.	90		50,000		10,000	Nov.	1878	0 20																				
Cleveland, G	Col.	3,715	250,000	25,000	10	*																							
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	775,000	Sept.	1878	0 20																				
Con. N. Slope & E. C. T.	Col.	15,000	500,000	10,000	50	*																							
Dahlonega	Ga.		250,000	250,000	1	*								18c	17c	17c	15c	16c	15c			16c	15c	16c	15c	11,700
Dana, C.	Mch.		500,000	20,000	25	68,000	Jan..	1863	0 50																				
Dawson, S.	Ont.		1,200,000	60,000	20			1878																					
Day	Nev.	1,500		100,000		55,000	Sept.	1878	0 25																				
Dayton	Nev.	1,600		100,000		750,000	Apr.	1878	0 25																				
De Frees	Ariz	1,500		100,000		115,000	Oct..	1878	15																				
Duncan, S.	Ont.		1,200,000	60,000	20	75,000	July	1876	41⅔																				
Exchequer, G. S.	Nev.	400	10,000,000	100,000	100	380,000	Jan..	1878	1 00																				
Gold Placer, G.	Col.		5,000,000	200,000	25									22c	21c	21c	19c	22c	20c			21c	20c	21c	18c	45,500
Granville, G.	N. C.	357 acs.	1,000,000	100,000	10	*			0 50																				
Humboldt, C.	Mch.		500,000	20,000	25	100,000	Sept	1878	0 15																				
Hussey	Nev.	4,500		100,000		95,000	Oct..	1878	0 25																				
International, S.	Ont.		1,200,000	60,000	20																								
Julia, G. S.	Nev.	3,000	11,000,000	110,000	100	745,000	Nov.	1878	1 00					3.15				3								300
Justice, G. S.	Nev.	2,100	10,500,000	105,000	100	2,658,500	Aug.	1878	1 05									4¼	4⅛							65
King's Mountain, G.	N. C.		1,200,000	120,000	10	*																				
Kossuth	Nev.	2,700		108,000		421,200	Aug.	1877	0 15																	
Lacrosse	Col.	3,900	1,000,000	100,000	10	*								30c	29c	31c	20c	31c	28c			30c	28c	30c	29c	17,800
Leviathan	Nev.	2,000		100,000		240,000	May.	1878	05																50c	40c	225
Luzerne	Col.	4,200	5,000,000	500,000	10	*																				
Madison, C.	Mch.		500,000	20,000	25	123,000	Sept	1876	0 10																	
Mariposa preferred	Cal.	44,387	5,000,000	50,000	100	1,425,000	June	1877	1 00																	
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	June	1878	1 00					2												100
McCracken	Ariz	4,500		100,000		100,000	Oct .	1878	0 50																	
Martin White	Nev.			100,000		500,000	July	1878	1 00																	
Mesnard, C.	Mch.		500,000	20,000	25	160,000	Apr.	1876	0 50																	
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	217,400	May.	1878	0 50					30c				31½								70
Minnietta Belle	Cal.	1,500		100,000		75,000	Apr.	1878	0 50																	
Mt. Bross Tunnel	Col.	8,600	2,000,000	200,000	10	*		1878																		
Navajo	Nev.	1,500		100,000		125,000	May.	1878	0 25					50c										50c		200
New York	Nev.	1,000		100,000		700,000	Nov.	1878	0 30																	
Occidental	Nev.	1,700		40,000		72,500	Feb.	1877	0 25																	
Orig. Keystone	Nev.	1,500	1,000,000	100,000	10	50,000	Oct.	1878	0 50																	
Overman, G. S.	Nev.	1,200	3,840,000	38,400	100	3,404,280	Sept.	1878	3 00																	
Osceola, C.	Mch.		1,000,000	40,000	25	2,567,880	Nov.	1877	3 00																	
Petherick, C.	Mch.		500,000	20,000	100	165,533	Mar.	1876	0 50																	
Pleasant View, G.	Col.	1,200	200,000	20,000	10	*																				
Quicksilver preferred	Cal	8,500	4,291,300	42,913	100	*																				
" common	Cal.	acres.	5,708,700	57,087	100											12		12								200
Rockland, C.	Mch		500,000	20,000	25	495,000	Jan..	1874	1 00																	
Seg. Belcher, G. S.	Nev.	160	640,000	6,400	100	244,800	Apr.	1876	5 00																	
Silver Hill, G. S.	Nev.	5,400	10,800,000	108,000	100	1,296,000	Sept.	1878	0 50																	
Silver Prize	Nev.	1,500		100,000		40,000	Nov.	1878	0 15																	
Star, C.	Mch.		500,000	20,000	25	205,000	Mar.	1876	0 50																	
Superior, C	Mch.		500,000	20,000	25	340,000	Mar.	1878	0 25																	
Sutro Tunnel	Nev.		20,000,000	2,000,000	10				0 50																	
Tiptop	Ariz			100,000		120,000	July	1878																		
Tioga	Cal.	1,500		100,000			Oct.	1878	0 20																	100
Trio																		45c								300
Trojan	Nev.	1,500		100,000		240,000	Oct.	1878	0 25																	
Tuscarora	Nev.			100,000		20,000	Nov.	1878	0 05																	
Union Cons. G. S.	Nev.		10,000,000	100,000	100	310,000	Apr..	1874	0 25																	
Utah	Nev.	1,000		20,000		680,000	Oct .	1878	1 00																	
Ward	Nev	1,200		110,000		66,000	Sept	1878	0 30																	
Wells Fargo	Nev.	1,500		108,000		216,000	Sept	1878	0 50																	

Total Assessment levied to date..... .....$57,870,313

g. Gold. s. Silver. L. Lead. c. Copper. * Non-Assessable. +4 15-16.

Total Dividends paid to date.....$151,380,231

Total Sales for the week.....111,550.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY	CLOSING QUOTATIONS						Opening Dec. 27
	Dec. 20.	Dec. 21.	Dec. 23.	Dec. 24.	Dec. 25.	Dec. 26	
Alpha	9¾	10	12	12½	....	12⅛	11¼
Alta	5⅞	5½	5¾	5⅞	....	5¾	5½
Argenta	....	....	....	....	....	....	....
Bechtel	....	½	½	½	....	½	....
Belcher	3⅝	3½	3½	3¾	....	3⅞	3½
Belle Isle	....	....	....	....	....	....	....
Benton	....	....	....	....	....	....	....
Best & Bel.	17¾	18	17¾	17⅞	....	17⅝	17½
BlackHawk	....	....	....	....	....	....	....
Bodie	10	9½	7¼	8	....	8½	....
Booker	....	....	....	....	....	....	....
Bullion	4⅝	4½	5	5¼	....	5½	4¾
Bulwer	....	....	....	....	....	....	....
Caledonia	2¼	2⅜	2½	2½	....	2½	2½
California	9⅜	9¾	10	9⅞	....	10	10
Chollar-Pot	38	38½	39	39	....	39½	39½
Confidence	9	....	9¼	9	....	....	....
Con. Imp	....	....	....	....	....	....	90
Con. Va	7⅞	7¾	8⅛	8⅛	....	8	8¼
Crown P'int	3⅜	3¾	3¾	3¾	....	3¾	3¾
Endowm'nt	....	....	....	....	....	....	....
Eureka Con	33½	32½	32½	32½	....	31	....
Exchequer	3⅝	3⅝	4	4	....	4½	3¾
Goodshaw	....	....	....	....	....	....	....
Gould & Cur	8⅝	8⅝	9	9	....	9⅛	9
Grand Prize	7¾	9	9⅛	8¾	....	8	....
Hale & Nor.	10⅜	10⅝	11	11⅝	....	11¾	11½
Hamburg	....	....	....	....	....	....	....
Homestake	....	18	18	17½	....	17½	....
Hussey	....	40	40	40	....	40	....
Indep'd'nce	....	1¼	1¼	1¼	....	1¼	....
Jackson	....	....	....	....	....	....	....
Julia Con	3	2⅞	2¾	2⅞	....	2⅞	3
Justice	4	4	4	3⅞	....	3⅞	4
Kentuck	3¾	....	4	3⅞	....	....	4
Kossuth	....	15	15	15	....	15	....
Leopard	....	1	....	1	....	1	....
Leviathan	....	35	35	35	....	35	....
Manhattan	....	....	....	....	....	....	....
McClinton	....	....	....	....	....	....	....
MeadowVal	....	....	....	....	....	....	....
Mexican	29	31	31	31	....	30¼	29½
Mono	....	....	....	....	....	....	....
Navajo	....	40	40	40	....	40	....
North. Belle	10	9⅞	9¾	9¾	....	9½	....
Ophir	37¼	38½	38	38¼	....	36¾	36
Orig. K'ys'e	....	....	....	....	....	....	....
Overman	10¼	10⅛	10	9⅞	....	10	10
P. Sheridan	....	¼	¼	¼	....	¼	....
Ray. & Ely	9⅛	9½	9	9	....	8	....
Richer	....	....	....	....	....	....	....
Savage	8¾	9⅛	9⅛	9	....	10	10
Scorpion	....	....	....	....	....	....	....
Seg. Belcher	....	....	....	....	....	....	18
Sierra Nev.	47¼	48	46¾	46½	....	43½	43
Silver Hill	1¼	....	1¼	1⅜	....	....	1¼
Silver King	....	....	....	....	....	....	....
Summit	....	....	....	....	....	....	....
Tioga	....	1	1¼	1¼	....	1¼	....
Tip Top	....	1½	1½	1½	....	1½	....
Union Con.	58¾	59⅛	58¾	59⅛	....	57¾	54½
Utah	....	....	....	....	....	....	12
Ward	....	....	....	....	....	....	....
WashoeCon	....	....	....	....	....	....	....
Wells Fargo	....	....	....	....	....	....	....
Yel. Jacket	15¾	14¾	14⅝	14⅞	....	14¾	14½
....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....

mine is 2½ feet wide, of very good ore. The Stonewall stopes are looking well. This company is shipping per week 200 tons of very fine ore to the Bodie mill, and commenced on the 14th to hoist ore through the Standard new shaft. It is believed that this company will declare a dividend in January.

Bodie is decidedly lower, and this in the face of the reported splendid appearance of the mine. Recent letters from the mine report it as looking very well, and the ability of the company to continue its regular shipments of bullion are apparently as good as ever.

Either this mine is grossly misrepresented, or else the stock is handled after the manner of the Comstocks, and presumably by the same element. Caledonia is firm. The north cross-cut on the 1600 level of this mine is in quartz of a favorable character, the pump is running an average of 11 hours per day.

The old bonanzas, California and Consolidated Virginia, show improvements, the former opening today at $10 per share, against $9½ a week ago, and the latter at $8¼ against $7¾, as in our last. Work is being actively prosecuted in both of these mines, and the California is making a very satisfactory showing in bullion shipments, while it is anticipated to soon begin the extraction of ore from two places in the Consolidated Virginia mine. The recent cool weather has cooled off the lower levels, so that working in them is not so difficult.

Chollar-Potosi shows an improvement of $1 per share. Active operations are in progress in all parts of this mine. The flow of water from the bottom of the combination shaft continues at the rate of 90,000 gallons per day.

In the Crown Point mines the appearances are quite favorable. The stock is steady.

Consolidated Pacific, a Bodie stock, is selling in San Francisco at from $1.90 to $2.25 per share. The new shaft in this mine is down 136 feet, and the company is extracting and having crushed at the miner's mill about eight tons per day.

Eureka Consolidated stock, for causes unexplained, continues its downward course, closing last night at $31, against $35¾ a week ago. Letters from the mine state that the ore-bodies are all looking well, with no indications of giving out for an indefinite period, and the stock of the Richmond Company, which adjoins this mine, is advancing on the London market.

Gould and Curry shows a little improvement. Good progress is being made in all parts of this mine.

Grand Prize closed last night at a slight advance on the price of a week ago. This company is making regular shipments of bullion and the ore taken out of the mine is very rich, the mill averages amounting to $175 per ton.

Hale and Norcross shows considerable improvement. The flow of water in this mine stands in the main incline about 45 feet below the 2000 level. The joint east drift on the 2000 level is making much better speed, having passed through the belt of hard rock; recently struck into much softer and more favorable ground. It is now in 694 feet.

We are without any quotation of Hamburg. The stock is sparingly dealt in on the San Francisco Board at from 75 to 90c. The appearance of this mine is very good, the ore carrying a heavy percentage of lead.

Hussey is steady, at 40c. The face of the main drift on the 500-foot level in this mine is still in quartz. Considerable water coming in. The ground is of a favorable character, and is working well.

Independence has been selling all the week at $1.25 per share. A recent letter from this mine says :

"Since last report a new shaft has been sunk and timbered 19 feet, total depth 104 feet; rock hard, but breaks well. The north drift 175-foot level has been extended 14 feet; 10 feet from present face encountered a porphyry cross-head which cut off the vein entirely. Will continue drifting some distance before cross-cutting. South drift 175-foot level has been advanced 17 feet. Vein has narrowed up considerably; ore low grade. The 80-foot level south drift has been run 24 feet; vein narrow; ore low grade."

Julia is steady. The recent breakage of a connecting-rod of the pump engine in this mine caused its stoppage until it can be replaced by a new one. In the meantime the water from the 2000 level is being hoisted to the surface with bailing tanks. The repairs to the main south drift on the 1800 level are making good speed, a T-rail track is being laid and the water confined in a drain, cut for that purpose, so as to cool off the drift.

The total length of south lateral drift of the Sutro Tunnel toward the Julia shaft from the main tunnel is 936 feet. The face is in fine ledge porphyry and vein matter which blasts and works favorably.

The Justice mill is kept steadily running on ore from the mine, crushing at the rate of 600 tons per month. The ore stopes are looking well, and the stock is steady.

About 400 tons of ore have recently been extracted from the Kentuck mine, which is looking well generally, and the stock shows a slight improvement.

Leviathan has been sparingly dealt in at the steady figure of 35c. per share. Reports from the mine state that on the 750 level the indications for soon reaching the ore-body are very favorable.

Leopard is steady at $1 per share. This company continues its regular shipments.

The stock of the Manhattan Mining Company shows no change in San Francisco, and but little activity. This company is now reducing per week about 140 tons of ore, having an assay value of over $250 per ton. The mine is reported as looking very well, with a diminution in the strength and richness of the ore-bodies on the lower levels.

In the McCrackin mine, in Arizona, an important strike is reported in the Bateman Tunnel, 900 feet below the surface. It is anticipated to soon start up on ore from this new discovery.

Enlarging the mainsouth drift in the Mexican mine connecting with the Ophir shaft on the 1600 level is making steady progress. Sinking the joint Union Consolidated winze below the 1600 level is going vigorously forward, the rock in the bottom being much softer and carrying favorable streaks of clay and quartz. It is now down 116 feet on the slope below the 1600 level. This stock shows some improvement.

Mono is selling in San Francisco at from $2.25 to $4.50 per share. The shaft in this mine has attained a depth of 317 feet, with favorable appearances in the bottom of the same.

Northern Belle is slightly lower. The bullion shipments from this mine continue regular.

Ophir is somewhat lower, the point of great interest just now is the 2200 level of this mine, where a station is being opened, and a cross-cut is about to be started for the ledge. As the ore-body encountered on the level above is believed to have a greater width on the 2200 level, this may have an important bearing on the future of the stock.

Sinking the new shaft of the Overman mine is progressing at the rate of four feet per day. It is now down 152 feet. The north lateral drift on the 1600 level is steadily advancing along the ore vein, the face in a very favorable mixture of quartz and porphyry. The east drift on this level is advancing in a very lively, healthy quartz formation. The stock of this company is steady at $10 per share. Raymond and Ely is lower. That part of this mine above the 10th level has been let on shares to chloriders; no expense is incurred by the company, except in raising the ore to the surface. 10th level uprise east shows larger vein, very hard carrying from $40 to $75 dollars per ton. Assays show from 40 to 80 per cent gold.

Savage shows some improvement. The water in the main incline is standing at a point 50 feet below the 2000 level. The joint east drift on the 2000 level has passed through the belt of hard rock encountered last week, and the face is now in very soft, favorable rock.

The new bonanzas are lower. Sierra Nevada at $43 to-day, against $47 last week, and Union Consolidated $54½, against $56½, as in our last. Sinking the south winze below the 2200 station of the Sierra Nevada is going vigorously forward, the bottom of the winze still in ore of a fine character. The formation has the same regularity and all the favorable indications that has characterized it for the last 100 feet or more. It is now down 71 feet below the 2200 station.

In the Union Consolidated, sinking the joint Mexican winze below the 1600 level is making good headway, the bottom being in a much softer character of porphyry, carrying occasional streaks of quartz of a very favorable character. It is now down 116 feet on the slope.

We note the statement that the Nevada Bank has raised the loaning rate on these stocks from $25 to $30 per share.

The *Commercial Herald* of the 19th inst. says of the market :

"There was a more general participation of the different shares on the list during the past week, but under it all the aggregate sales in the regular sessions of the San Francisco Board fell off some $300,000, as compared with last week. The market was moderately active, and prices ruled quite regularly, nothing of any moment transpiring to either improve or depress ruling rates. At the close a better feeling prevailed, and a slight upward tendency manifested itself, however without showing any thing like a possible steady advance at this season of the year. We can at present see nothing to warrant such a movement, particularly not in any developments: and as for concentration of stocks, that does not yet seem to be fully accomplished to carry out its usual successful purpose.

"California extracts some 360 tons of ore per day. The lower level continues to run in vein formation.—Consolidated Virginia lower level also runs in vein matter. Sierra Nevada continues to report 'better ore finds than ever,' which, however, do not create a very marked change in the market price of the stock. If the stock were largely distributed, we think it would make a very material difference—that prices would be more fluctuating."

The Bald Mountain Gravel Mining Co., Sierra Co., Cal., has paid $664,000 in dividends and mined $1,300,000, gold.

The Eureka Cons. Mining Co. has declared a dividend of $3 per share.

Indian Queen Mining Co.—A dividend of 25c. per share has been declared by this Company.

The Tybo Cons. Mining Co. has increased its capital stock from 50,000 shares at $200 each to 150,000 shares at $100 each.

ASSESSMENTS with dates when delinquent: Martin White, $1½, January 21st; Crown Point, $1, January 13th; Utah, $2, January 16th; Mt. Diablo, 50c., January 20th; Benton, 50c., January 15th; Black Hawk, 25c., January 11th; Rye Patch Con., $1; Senator Mining Co., $1, January 20th; Defiance, 10c., January 23d.

NEW INCORPORATIONS.

We note the recent organization of the following companies in addition to those announced in our issue of Dec. 7th :

Walker Mill Mining Co	Cal.	$3,000,000
Great Hope Mining Co	Colo.	10,000,000
Arizona Cons. Mining Co	Ariz.	10,000,000
Ophir Silver Mining Co	"	10,000,000
Franklin Silver Mining Co	"	10,000,000
Uncle Sam Mining Co	"	10,000,000
Apache Mining Co	"	6,000,000
Nob Hill Mining Co	"	10,000,000